Chapter Twenty-Eight

GUIDELINES FOR PREPARING UTILITY PLANS

MONTANA RIGHT-OF-WAY
DESIGN MANUAL

Chapter Twenty-Eight
GUIDELINES FOR PREPARING UTILITY PLANS

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Chapter Twenty-Eight
GUIDELINES FOR PREPARING UTILITY PLANS

28-1 UTILITY SECTION OVERVIEW

The Utilities Section, which is part of the Right-of-Way Bureau, acts as liaison between the Montana Department of Transportation (MDT) and utility companies when these Companies wish to locate facilities within MDT right-of-way and when utilities require relocation or modification because of conflicts with MDT projects.

With respect to relocation activities, the Utilities Section provides guidance on issues and works directly with utility companies to determine relocation alignments and create agreements for cost sharing. The Utilities Section processes relocation agreements for approval. It also handles bills from utility companies for cost reimbursement. The Section serves in a similar capacity when County/City water and sanitary sewer facilities must be relocated for a construction project.

The Utilities Section develops and implements procedures governing the occupancy of highway facilities by public utilities. It is responsible for ensuring compliance with Federal codes, Montana statutes and Department policies relating to utilities. This includes provisions governing eligibility for cost reimbursement for utility relocations.

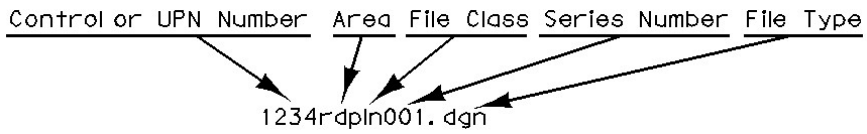
The Utilities Section administers the Department's Subsurface Utility Engineering (SUE) Program. The program uses engineering consultant contractors to locate, survey and obtain depths of utilities for selected MDT reconstruction projects.

28-2 UTILITY PLANS PREPARATION

28-2.1 Title Sheet

The title sheet should show the project location on the State map and in more detail on the County map. It should include the project beginning and ending stations; bridge stations, if any, and clearly identify the route number and County. A plan legend will also be included showing standard symbols and symbology shown on the utility plans. Related and associated projects along with the FHWA/MDT approval and R/W map revised block are also included. Design data, Federal R/W project number, project name, County and project length are shown on the utility title sheet.

All references to design files assume that proper DMS naming conventions have been followed. In this and all other procedures, 1234 represents the 4-digit project control number, as shown in Figure 28-1.



PROJECT CONTROL NUMBER

Figure 28-1

The title sheet is created as follows:

1. Download the title sheet from the “rd” workgroup in DMS, which is usually named “1234rdttl001”. Copy this file to the “c:\dgn\ref” directory for referencing. Rename the original downloaded file in “c:\dgn” to “1234utttl001”. Download the R/W title sheet from DMS, which is usually named “1234rottl001”, and move it to the directory “c:\dgn\ref” for referencing.

2. Open the file “1234utttl001” and move the title sheet to page 1, if not already there.

3. Delete all active elements with the exception of the arrow and text “THIS PROJECT” in the State map portion of the title sheet.

4. Open the “Reference File” dialog and turn off all levels except levels 1-4 in the “planm” (“sht”) reference file.

5. Attach reference file “utiplanmV80.ref” to the file:

   Logical name – “sht1”, and
   Description – utility English (metric) plan sheets.

6. Turn off all levels in reference file “utiplanmv80” (“sht1”) except:

   16 – plan legend,
   17 – north arrow (if needed),
   18 – R/W approval blocks,
   19 – utility plan designation,
   30 – 36 utility standard symbologies,
   49 – utility designation (left border),
   54 – State map,
   55 – design data block, and
   57 – MDT designation.

7. Place cell “TTLSHT” from “utilityV8_0” cell library and fill in the project information data fields. Note that the project agreement number is the same as the R/W agreement number.

8. Attach as reference the file from “c:\dgn\ref” containing the road title sheet “1234rdttl001” and move down to sheet 1, if not already there:

   Logical name – “rd1”, and
   Description – design data.

9. Place fence around design data (upper right hand corner) and clip reference file (“rd1”) to show design data only.

10. Copy reference file (“rd1”) and rename to:

    Logical name – “rd2”, and
    Description – title map.

11. Place fence around County map area and clip bound to show map and project map information. You may need to move reference file (“rd2”) to display this information clearly.

12. Attach as a reference from “c:\dgn\ref” the R/W title sheet “1234rottl001”. Move to correct location in the utility title sheet design file, if necessary:

    Logical name – “rw1”, and
    Description – authorization.

13. Place fence around FHWA\MDT approval, Associated and Related projects blocks and clip bound (“rw1”) to show this data only.

14. In the active file, turn on the level symbology setting from the “View Attributes” dialog. Go to “Settings” – “Level” – “Symbology” and override color in the active design file to 0, then save settings.

15. Attach “utilityV8_0” color table to the active design file.

16. Open “Reference File” dialog box and set color symbology override to color 0 in all reference files with the exception of “utiplanmv80.ref”.

17. For the reference file “utiplanmv80”, override all color level symbologies to color 0, except for levels 30 – 36 that are overridden to:

    30 – 3 (Red),
    31 – 20 (Gold),
    32 – 0 (White),
    33 – 2 (Green),
    34 – 5 (Purple),
    35 – 6 (Orange), and
    36 – 1 (Blue).

18. Copy shape from level 9 in “utiplanmv80” (“sht1”) reference to active file making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.

28-2.2 Table Contents, Notes Sheet

The table of contents is unique to the utility plans and lists all sheets contained in the utility plans package. All sheets in the utility plans begin with a capital “U” in the page number sequencing, with the exception of the cross sections that are a direct copy from the road design plans and numbered accordingly. Other items that may be included on this sheet are notes, skew diagram, clear zone table and linear & level data.

The following procedure assumes the table of contents is to be included as page 2 in the title sheet file “1234utttl001”. All references to design files assume proper DMS naming convention has been followed.

Use the following procedure for creating the utility table of contents sheet:

1. Open design file “1234utttl001” and window area to view sheet 2.

2. Open the “Reference File” dialog box and turn on the following level in the “utiplanmv80” (“sht1”) reference file: 52 – utility project information block (right side of sheet).

3. Place cell “PLNSHT” from “utilityV8_0” cell library and fill in the project information data along the right hand side of sheet.

4. Place cell “TBLCON” from “utilityV8_0” cell library and drop status and edit to show table of contents information from the utility plans package.

5. Attach as a reference the downloaded file from “c:\dgn\ref” containing the table of contents “1234rdttl001” and move, if necessary, so the table of contents and notes are visible in sheet 2:

   a. Logical – “rd3”, and
   b. Description – Notes.

6. Place fence around notes and clip bound to show notes and any other information that can be clearly shown with the same clip bound. Move reference to center in right upper 1/3 of sheet.

7. Copy reference file (“rd3”) and rename to:

   a. Logical – “rd4”, and
   b. Description – Linear & Level.

8. Place fence and clip bound around linear and level data, and then move to display clearly on sheet.

9. Repeat the above steps to attach other references as necessary.

10. Make any final adjustments to all reference files to display clearly on the page, and then set reference file color symbology to 0 on all references to this page.

11. Copy shape from level 9 in “utiplanmv80” (“sht1”) reference to active file making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.

28-2.3 Control Diagram and Abstract Sheet

The control diagram is used to establish a permanent, recoverable horizontal and vertical control system for highway design and construction. All topography and design data, including utilities, hydrology, right-of-way, bridge and miscellaneous data, is tied to the control diagram. The control abstract gives the coordinates and elevation of each control point along with a brief description of how to find or reach the control point. The control diagram and abstract are made available to utility companies for use in engineering utility relocation work and is included in the utility plans package.

All reference to design files assumes proper DMS naming conventions have been followed. The following procedure assumes a new utility design file is to be made for the control diagram and abstract, and the control diagram abstract will fit on one sheet. Modifications to this procedure, the procedure itself, or portions of the procedure may need to be repeated, if more than one sheet is needed for the complete control diagram and abstract.

Use the following procedure for creating the utility control diagram and abstract sheet:

1. Download the file from the “rd” workgroup in DMS that contains the control diagram and abstract, which is usually named “1234rdtrv001”. Copy this file to the “c:\dgn\ref” directory for referencing. Rename the original downloaded file in “c:\dgn” to “1234uttrv001”. Open the file and delete all active elements.

2. Attach the reference file “utiplanmV80.ref” to the file:

    a. Logical – “sht1”, and
    b. Description – utility English (metric) plan sheets.

3. Turn off all levels in reference file (“sht1”) except for:

    a. Level 49 – utility designation (left border), and
    b. Level 51 − utility project information block (right side of sheet).

4. Turn off all levels, except 1-4 in “planm.ref” (“sht”) reference file.

5. Attach “utilityV8_0” color table to the active design file.

6. In the active file, turn on the level symbology setting from “View Attributes” dialog. Go to “Settings” – “Level” – “Symbology” and override color in the active design file to 0 then save settings.

7. Place cell “PLNSHT” from “utilityV8_0” cell library and fill in the project information data along the right hand side of sheet.

8. Attach as reference the original file from “c:\dgn\ref” containing the control traverse “1234rdtrv001”. Clip bound the reference to show only the traverse diagram. Adjust, as needed, to fit sheet and display information clearly.

    a. Logical – “rd1”, and
    b. Description – control traverse.

9. Copy and rename the reference file attachment (“rd1”) to:

    a. Logical – “rd2”, and
    b. Description – control abstract.

10. Adjust the clip boundary to show only the control abstract and/or other information contained in the “rd” area control diagram sheet. Move, if necessary, to display clearly on the sheet.

11. Download and attach the topography file as a reference. It is usually located in the “di” workgroup in DMS, but may be from other workgroups depending on the project. This file will need to be scaled, rotated and moved to fit the sheet:

    a. Logical – “fld1”, and
    b. Description – topography.

12. Turn off all levels, except those containing general topo (e.g., fences, buildings, ptw, streams, breaklines).

13. Open level symbology in the “Reference File” dialog, and override all levels color symbology to color 32 (gray).

14. Attach R/W map file as reference. This can be accomplished by copying the (“fld1”) reference file and renaming the copy to the R/W map file “1234romap001”. By copying and renaming the reference file, the scale, rotation and location of the (“fld1”) file is applied to the R/W map file.

    a. Logical – “rw1”, and
    b. Description – right-of-way.

15. Open “Reference File Level” dialog and turn off all levels except:

    a. 16 – Exterior section lines, and
    b. 35 – Interior section lines.

16. Override all level 16 to color 0 (white) and level 35 to color 32 (gray).

17. Attach as a reference the file containing utilities. The utility information is usually contained in one or more of the following files: “1234utsue001”, “1234utmap001”, “1234rdmap001”, “1234dimap001” or “1234phmap001”.

    This can be accomplished by copying the (“fld1”) reference file and renaming the copy to the utility map file (e.g., “1234utmap001”). By copying and renaming the reference file, the scale, rotation and location of the (“fld1”) file is applied to the utility map file:

    a. Logical – “ut1”, and
    b. Description – Utilities.

18. Repeat the above steps, if more than one file contains utility information (e.g., logical – “ut2”…).

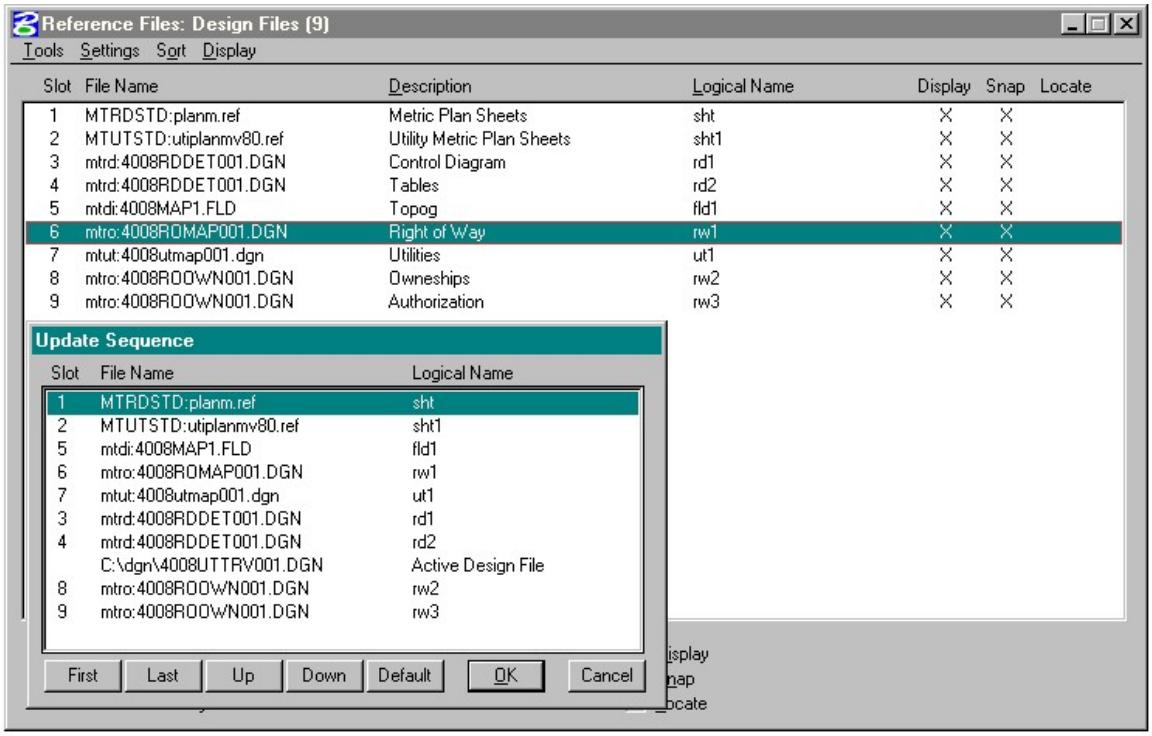
19. Open reference file dialog box and turn on utility levels and override reference file colors as follows:

    a. 30 – power, 3 (Red),
    b. 31 – gas, 20 (Gold),
    c. 33 – san & storm, 2 (Green),
    d. 34 – television, 5 (Purple),
    e. 35 – telephone. 6 (Orange), and
    f. 36 – water, 1 (Blue).

20. As shown in Figure 28-2, open “Reference File” dialog box. Go to “Settings” – “Update Sequence” and change update sequence as follows:

    a. Plan Sheet Borders (“sht”),
    b. Utility Plan Sheet (“sht1”),
    c. Topography (“fld1”),
    d. Right-of-way (“rw1”),
    e. Utilities (“ut1”),
    f. Control Diagram (“rd1”),
    g. Abstract, Tables (“rd2”), and
    h. Active Design File.

21. Copy shape from level 9 in “utiplanmv80” (“sht1”) reference to active file making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.



UPDATE SEQUENCE

Figure 28-2

28-2.4 Ownership Sheet

The ownership sheet gives the names and addresses of the adjacent property owners along the highway construction project. The ownership sheet also states the right-of-way, easement and construction permit areas needed from each property owner for the proposed construction project. The property owners are shown by parcel numbers and cross-referenced to the utility plan sheets. Also shown with the ownership sheet are the FHWA/DOT approval date and the date of the last revision to the right-of-way map.

All reference to design files assumes proper DMS naming conventions have been followed. The following procedure assumes a new utility design file is to be made for the ownership sheet, and the ownerships will fit on one sheet. This procedure may need to be repeated, if more than one sheet is needed for the complete ownerships of the project.

Use the following procedure for creating the utility ownership sheet:

1. Download the file from the “ro” workgroup in DMS that contains the ownerships, which is usually named “1234roown001”. Copy this file to the “c:\dgn\ref” directory for referencing. Rename the original downloaded file in “c:\dgn” to “1234utown001”. Open the file and delete all active elements.

2. Attach the reference file “utiplanmV80.ref” to the file.

    a. Logical – “sht2”, and
    b. Description – utility English (metric) plan sheets.

3. Turn off all levels in reference file (“sht2”) except for:

    a. Level 25 – R/W Authorization,
    b. Level 49 – utility designation (left border), and
    c. Level 51 - utility project information block (right side of sheet).

4. Turn off all levels, except 1-4 in “planm.ref” (“sht1”) reference file.

5. Turn off display of reference “metrwpl.ref” (“sht”).

6. Attach “utilityV8_0” color table to active design file.

7. In the active file, turn on the level symbology setting from “View Attributes” dialog. Go to “Settings” – “Level” – “Symbology” and turn off all overrides in the active design file then save settings.

8. Place cell “PLNSHT” from “utilityV8_0” cell library and fill in the project information data along the right hand side of the sheet.

9. Change color of all active elements in the design file to color 0.

10. Place cell “OWNER” from “utilityV8_0” cell library and drop status on cell.

11. Attach as reference the original file from “c:\dgn\ref” containing the ownerships “1234roown001”. Clip bound the reference to show only the owners and ownership areas and information (i.e., everything but the page numbers). Adjust, as needed, to fit “OWNER” cell and display information clearly.

    a. Logical – “rw1”, and
    b. Description – ownerships.

12. Delete all unnecessary lines from the ownership cell (“OWNER”) and fill in utility plan sheet numbers.

13. Copy and rename the reference file attachment (“rw1”) to:

a. Logical – “rw2”, and
b. Description – authorization.

14. Adjust the clip boundary to show only the FHWA/DOT approval date and map-revised date. Move, if necessary, to display in the designated box.

15. Open “Reference File” dialog and override colors in all references to color 0.

16. In “Reference File”, update the “Sequence” dialog box and change sequencing as follows:

a. Plan Sheet Borders (“sht1”),
b. Utility Plan Sheet (“sht2”),
c. Active Design File,
d. Ownerships (“rw1”), and
e. Authorization (“rw2”).

17. Copy shape from level 9 in “utiplanmv80” (“sht2”) reference to active file, making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.

28-2.5 Typical Sections

One or more typical sections are required for each set of plans. Typical sections are used to illustrate the cross section for a roadway section, the basis for surfacing quantities, roadway widths for tangent and superelevated sections, and cut and fill slope rates. Typical sections also show roadside ditches, curbed and uncurbed sections, median widths, sidewalks, driving lanes, shoulder widths, turn lanes and other roadway surface features.

Note that all reference to design files assumes proper DMS naming conventions have been followed. The following procedure assumes a new utility design file is to be made for the typical sections and that the typical sections will fit on one sheet.

Use the following procedure for creating the utility typical sections:

1. Download the file from the “rd” workgroup in DMS that contains the typical sections, which is usually named “1234rdtyp001”. Copy this file to the “c:\dgn\ref” directory for referencing. Rename the downloaded file in “c:\dgn” to “1234uttyp001”. Open the file and delete all active elements.

2. Attach the reference file “utiplanmV80.ref” to the file.

   a. Logical – “sht1”, and
   b. Description – utility English (metric) plan sheets.

3. Turn off all levels in reference file (“sht1”) except for:

   a. Level 41, 42, 43 – half sheet split lines sheets 1,2 & 3 (if needed),
   b. Level 49 – utility designation (left border), and
   c. Level 51, 52, 53 - utility project information blocks sheets 1, 2 & 3.

4. Turn off all levels except 1-4 in “planm.ref” (“sht”) reference file.

5. Attach “utilityV8_0” color table to active design file.

6. In the active file turn on the level symbology setting from the “View Attributes” dialog box. Go to “Settings” – “Level” – “Symbology” and override color in active design file to 0 then save settings

7. Place cell “PLNSHT” from “utilityV8_0” cell library and fill in the project information data along the right hand side of sheets.

8. Attach as reference the file from “c:\dgn\ref” containing the typical sections “1234rdtyp001”. Clip bound the reference file around the 1:50 scale sheets.

   a. Logical – “rd1”, and
   b. Description – original road typicals.

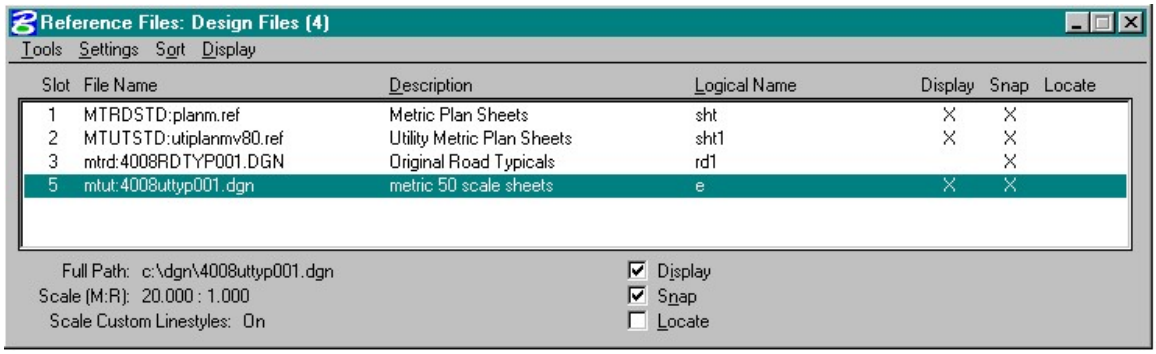
9. Copy typical section elements from reference file (“rd1”) into active file “1234uttyp001” and turn off display of reference file (“rd1”).

10. Open reference file dialog and rename reference “1234rdtyp001”, English (metric) 50 scale sheets, (“e”) to active design file name “1234uttyp001”. Typical sections should now be displayed in the main plotting sheets. See **Figure 28-3**.

11. Adjust elements in 1:50 scale sheets to display properly and clearly in the main plotting sheets.

12. Open “Reference File” dialog and override colors in all references to color 0.

13. Copy shape from level 9 in “utiplanmv80” (“sht1”) reference to active file, making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.



RENAME REFERENCE FILE

Figure 28-3

Changes to the typical sections by the Design Section will not be automatically updated in the utility typical section file. If changes are made to the typical sections, then active elements in the 1:50 scale sheet will need to be deleted, the reference ("rd1") will need to be turned on and Items 9 & 11 redone.

28-2.6 Detail Sheets

Detail sheets are used for those items that require more specific information than can be adequately described on the plan/profile sheets. Details in the utility plans may include: detours, rumble strips, drainage details, signing, electrical or geometric details. Mass diagrams are not included with the utility plans. Each project will have its own unique set of details and inclusion of each detail is determined on a project-by-project basis.

All reference to design files assumes proper DMS naming conventions have been followed. The following procedure assumes a new utility design file is to be made for the details, and the details will fit in one design file.

28-2.6.1 Detail Sheet No.1 – Pipe Detail

Use the following procedures:

1. Download the file from the "rd" workgroup in DMS that contains the details, which is usually named "1234rddet001". Copy this file to the directory "c:\dgn\ref" for referencing. Rename the original downloaded file in "c:\dgn" to "1234utdet001". Open the file and delete all active elements.

2. Attach the reference file “utiplanmV80.ref” to the file:

    a. Logical – “sht1”, and
    b. Description – utility English (metric) plan sheets.

3. Turn off all levels in reference file (“sht1”) except for:

    a. Level 41, 42, 43 – half sheet split lines sheets 1,2 & 3 (if needed),
    b. Level 49 – utility designation (left border),
    c. Level 51, 52, 53 - utility project information blocks sheets 1, 2 & 3, and
    d. Level 61, 62, 63 – detail title block sheets 1, 2 & 3.

4. Turn off all levels except 1-4 in “planm.ref” (“sht”) reference file.

5. Attach “utilityV8_0” color table to active design file.

6. In the active file, turn on the level symbology setting from the “View Attributes” dialog box. Go to “Settings” – “Level” – “Symbology” and override color in the active design file to 0 then save settings

7. Open reference file dialog and override reference file level color symbology to color 0 in file (“sht”) & (“sht1”) references.

8. Place cell “PLNSHT” from “utilityV8_0” cell library and fill in the project information data along the right hand side of sheets.

9. Attach as reference the file from “c:\dgn\ref” containing the details “1234rddet001”. Clip bound the reference file around sheet 1 or portion of sheet 1 depending on the detail:

    a. Logical – “rd1”, and
    b. Description – pipe detail (name of detail).

10. Override reference file level color symbology to color 0 (“rd1”).

11. If other references are displayed with the detail set level symbology color, override on those references to color 0. Unless some items would be more clearly displayed using gray scale, then set reference level color symbology to color 32 for those levels.

12. If it is determined that utilities should be displayed along with the detail, then:

    a. Attach the file containing utilities, which is usually “1234utsue001”:

        - Logical – “ut1”, and
        - Description – Utilities.

b. Move, scale, rotate and clip bound the reference to position and display correctly on the detail.

13. Turn off all levels in ("ut1"), except for the utility levels 30-36. Open "Reference File" dialog level symbology and override level colors to:

a. 30 – color 3 Red, Electrical;
b. 31 – color 20 Gold, Gas;
c. 32 – color 0 White, Hazards;
d. 33 – color 2 Green, Sanitary and Storm Sewer;
e. 34 – color 5 Purple, Television;
f. 35 – color 6 Orange, Telephone; and
g. 36 – color 1 Blue, Water.

14. Make any final adjustments to detail and detail references to display and print properly.

28-2.6.2 Detail Sheet No. 2 – Detour

In this example, the following is assumed:

1. The following reference files are attached to the original detour detail from the "rd" workgroup:

a. "1234rdmap001" – design, logical ("rdmap1"),
b. "1234rdmap001" – profile, logical ("rdpro1"),
c. "1234dimap001" – topog, logical ("dimap1"), and
d. "1234romap001" – R/W lines, logical ("romap1").

2. Construction limits for the detour are on level 34 in the design map file, and levels 5 & 6 contain the detour centerline and annotation.

3. This is sheet 2 of the detail sheet file "1234utdet001".

4. Above and below ground utilities are in file "1234utsue001".

5. In reference file attachment "utiplanmV80" ("sht1"):

a. Turn off level 42 – half sheet split lines sheet 2,
b. Turn on level 12 – profile grid sheet 2, and
c. Override reference color symbology to color 32 for level 12.

6. Attach as reference the file from “c:\dgn\ref” containing the details “1234rddet001”. Clip bound the reference file around sheet 1 or portion of depending on the detail:

    a. Logical – “rd2”, and
    b. Description – Detour (name of detail).

7. Clip bound reference to display sheet 2 – detour elements.

8. Copy all detour elements from (“rd2”), including profile notes, text and elevations to active design file.

9. If necessary, move all detour references to fit on sheet usually left 30 (dl=-30).

10. Adjust all active elements to display properly in active file. Delete elevation text displayed along right side of profile portion of detail sheet.

11. If title block is used, clip mask profile grid (“sht1”) around title block. Move title block text if necessary.

12. Turn display off for reference file (“rd2”).

13. Open reference file dialog and in reference (“rdmap1”) adjust as follows:

    a. Turn off level 4 – Mainline curve annotation,
    b. Turn on levels 5 & 6 – Detour centerline and annotation, and
    c. Turn on level 34 – Detour construction limits.

14. Open “Reference File Level Symbology” dialog and override color symbology to color 0 in reference file (“rdmap1”), except:

    a. 3 (mainline centerline) – color 32,
    b. 33 (mainline construction limits) – color 32, and
    c. any other level that would be better displayed with color 32 (gray).

15. Override level color symbology in file (“dimap1”) to color 32 except for any levels that would be better displayed with color 0 (black).

16. If utilities are also included in the dimap, turn off the levels containing the utilities usually levels 30 – 36.

17. Open reference file levels dialog box for reference file (“romap1”) and turn off all levels except for:

    a. 16 – Section lines,

b. 30 – Existing R/W,
c. 31 – Proposed R/W,
d. 34 – Property and Lot lines,
e. 35 – Interior section lines,
f. 36 – Construction permit lines,
g. 38 – Proposed easements, and
h. 40 – Railroad R/W.

18. Override reference level color symbology to color 0 in ("romap1") except for levels 16, 34 & 35, which are overridden to color 32.

19. If right-of-way callouts and dimensions are to be shown on the detour detail, download and attach as reference the appropriate file from the "ro" workgroup (i.e., "1234ropln001"):

    a. Logical –"rwpl1", and
    b. Description – R/W plan.

20. Move and adjust, as necessary, to display properly on the detour detail.

21. Open "Reference File" dialog and turn off all levels except:

    a. 28 – existing R/W & easement text,
    b. 28 – existing R/W & easement calls,
    c. 32 – new R/W & easement calls, and
    d. 37 – construction permit text.

22. Override reference file color level symbology in ("rwpl1") to color 0.

23. Copy reference file attachment ("rdmap1") and rename to file "1234utsue001".

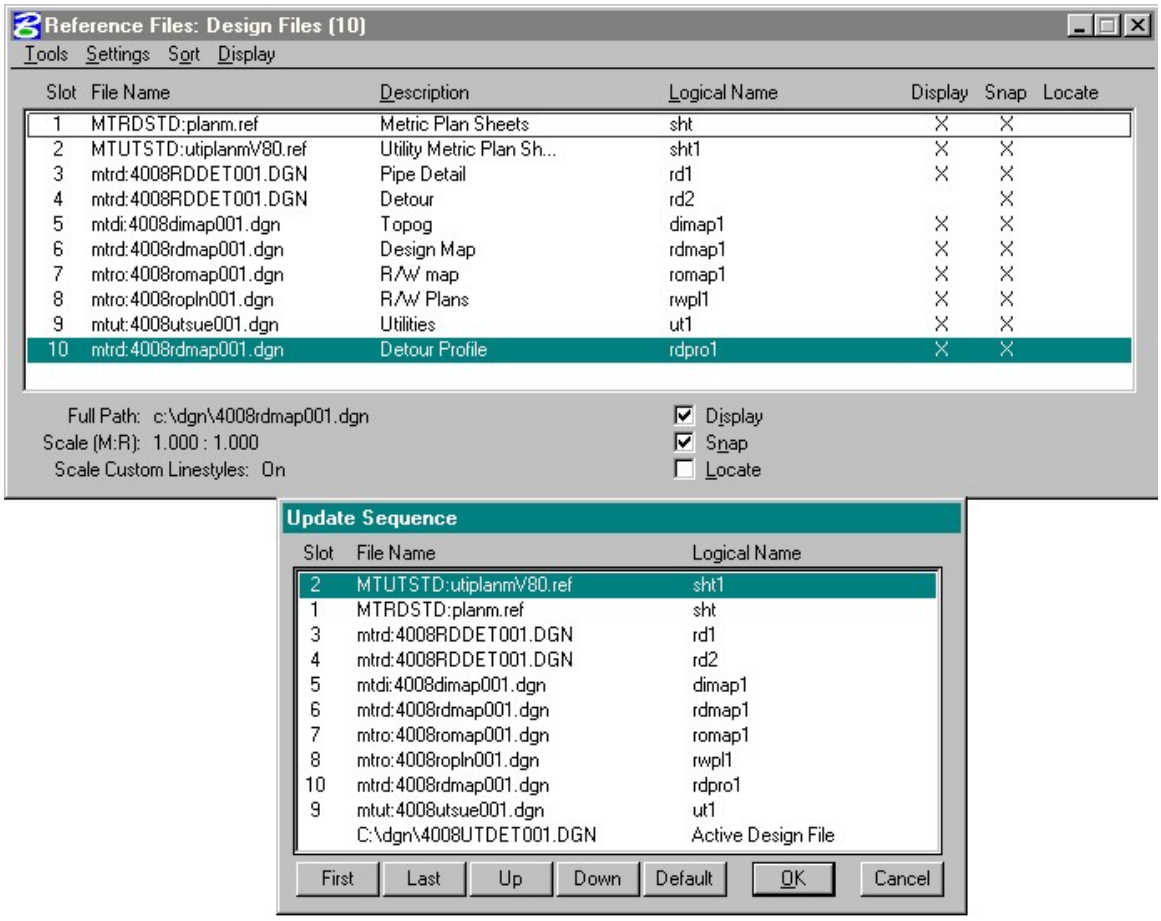
    a. Logical – "ut1", and
    b. Description – Utility map.

24. Turn off all levels in ("ut1") except for the utility levels 30-36. Open reference file dialog level symbology and override level colors to:

    a. 30 – color 3 Red, Electrical,
    b. 31 – color 20 Gold, Gas,
    c. 32 – color 0 White, Hazards,
    d. 33 – color 2 Green, Sanitary and Storm Sewer,
    e. 34 – color 5 Purple, Television,
    f. 35 – color 6 Orange, Telephone, and
    g. 36 – color 1 Blue, Water.

25. As shown in Figure 28-4, change update sequence in “Reference File” dialog to display in order:

    a. “Planm.ref” (“sht”),
    b. “Utiplanm.ref” (“sht1”),
    c. “1234dimap001” (“dimap1”) – topog,
    d. “1234rdmap001” (“rdmap1”) – design,
    e. “1234romap001” (“roamp1”) – R/W lines,
    f. “1234ropln001” (“rwpl1”) – R/W text,
    g. “1234rdmap001” (“rdpro1”) – design profile,
    h. “1234utsue001” (“ut1”) – utilities, and
    i. Active Design File.



CHANGE UPDATE SEQUENCE

Figure 28-4

26. Copy shape from level 9 in “utiplanmv80” (“sht1”) reference to active file, making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.

28-2.7 Plan\Profile Sheets

The intent of the utility plan\profile sheets is to clearly distinguish the relationship between construction, right-of-way and other design features with the utilities located along or adjacent to the proposed highway construction project. The utility plan/profile sheet resembles the Department’s standard plan\profile sheet, but with the profile portion of the sheet reduced, expanding the plan portion of the sheet.

As a general rule in the utility plan\profile sheets, existing topography (e.g., buildings, trees, ex. R/W) is shown with gray lines, new items (e.g., const. limits, pipes, new R/W) are shown with black lines and all utilities are shown with the proper color coded lines.

Note that all reference to design files assumes proper DMS naming conventions have been followed. The following procedure assumes that a SUE survey was performed locating all above and belowground utilities and that all mapping and survey files follow CADD standards with regards to levels. The procedure also assumes a new utility design file is to be made for the plan sheets, and the plan sheets will fit in one design file. The procedure will need to be repeated or modified if more than one plan\profile sheet design file is needed.

Use the following procedure for creating utility plan\profile sheets:

1. Download the plan\profile sheets from the “rd” workgroup directory in DMS to the “c:\dgn” directory. Copy this file to the “c:\dgn\ref” directory for referencing. Check to make sure all the following files were downloaded:

    a. In the “c:\dgn directory”: “1234rdplp001” (“rd” workgroup plan\profile sheets)

    b. In the “c:\dgn\ref” directory:

    - “1234dimap001” (district field survey file)
    - “1234phmap001” (photogrammetry survey file)
    - “1234rdmap001” (road design map file)
    - “1234romap001” (R/W map file)
    - “1234utsue001” (SUE map file)
    - “1234ropln001” (“ro” workgroup plan sheets)

c. The above files represent a typical reconstruction project. Some projects may require more or less files and will not be specifically covered with these procedures.

2. Open each map or survey file and check for level conformance according to established CADD standards. If discrepancies are found, notify the responsible unit or area to make the corrections. In some circumstances, a separate map file can be made ("1234utmap001") that will allow transparent corrections of map or survey files to be made. Discretion must be exercised when using this method to ensure the integrity of the original file is not affected.

3. Rename the original plan\profile sheet in the "c:\dgn" directory from "1234rdplp001" to "1234utplp001". Open file and turn on level symbology in "View Attributes" dialog box then save settings.

4. Attach "utilityV8_0" color table to active design file. Open "Reference File" dialog and attach reference file "utiplanmV80" as reference file:

   a. Logical – "sht1", and
   b. Description – utility English (metric) sheets.

5. Turn off all levels in "utiplanm" ("sht1") except:

   a. 11, 12, 13 – Profile grid sheet 1-3,
   b. 49 – Utility designation (left border), and
   c. 51, 52, 53 – Utility project information blocks.

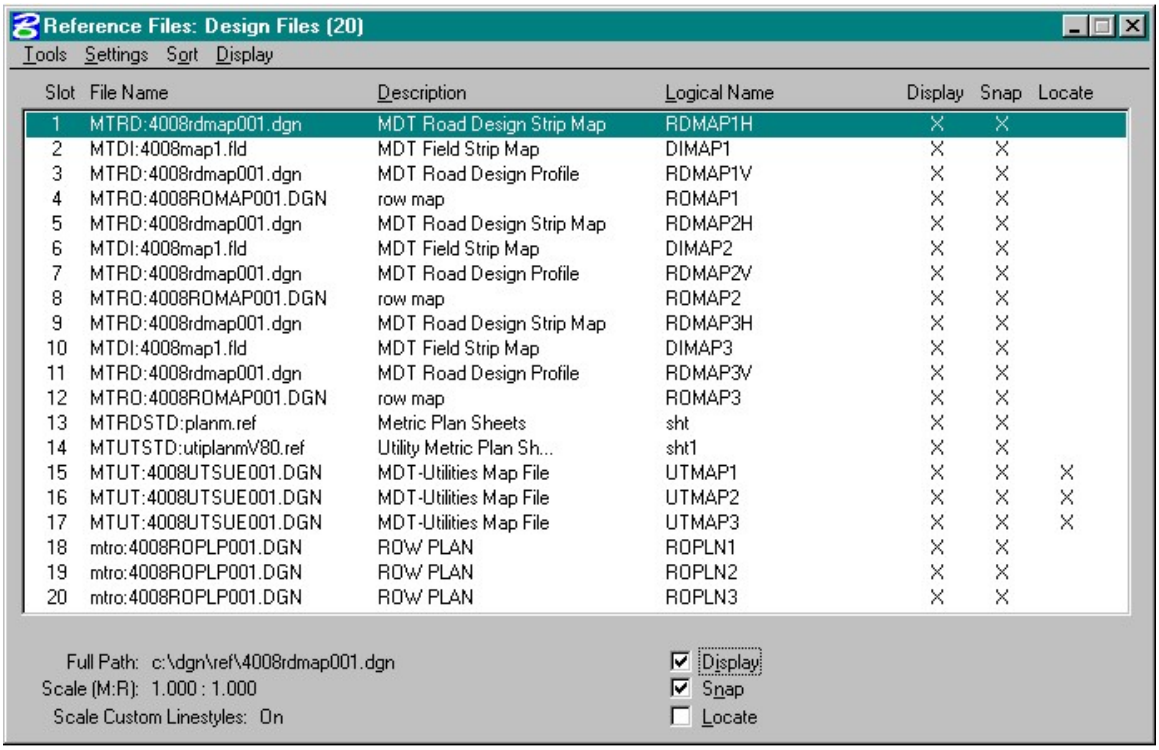
6. Open "Reference File" dialog level color symbology and override levels in reference file ("sht1"), 11 – 13 to color 32 (gray) and all other levels to color 0 (white).

7. Turn off all levels except 1 – 4 in "planm.ref" ("sht") reference file. Override all levels color symbology for reference ("sht") to color 0 (white).

8. Open reference file dialog and check for correct reference file attachments and naming as shown in **Figure 28-5**. See CADD standards for correct naming conventions. If reference files are missing or need adjusting, add or make the necessary adjustments.

9. Delete profile elevation text along the right side of the sheet and the project information in the upper right corner of sheets.

10. Attach "utilityV8_0" cell library, place cell "PLNSHT" and fill in the project information along the right side of the sheet.



CHECKING FILE ATTACHMENTS AND NAMING

Figure 28-5

11. Inspect profile for placement and, if necessary, move down to fit profile grid. It may be necessary to split the profile to fit the grid. To do this:

    a. In “Reference File” dialog, select “Copy Attachment” and “Copy Profile” (“RDMAP1V”) one (1) time:

    - Logical – “RDMAP1Va”, and
    - Description – MDT Road Design Profile.

    b. Place fence and clip bound around area of original profile (“RDMAP1V”) to be viewed on profile grid. Move profile down in increments of 20, if necessary.

    c. Place fence around area of the profile copy (“RDMAP1Va”) not shown in first profile (“RDMAP1V”). Move down in increments of 20 to fit on profile grid.

    d. Copy profile elevation text, from left side of profile grid, and move down the same amount as the profile copy (“RDMAP1Va”). Then move to show elevations properly on profile.

12. Open “Reference File” dialog and go to “Settings” − “Level Symbology” − “Color” and override all profile levels to color (0) white.

13. Move all profile related notes (e.g., approach notes, guardrail, inlet or outlet ditches) to position on profile grid. Move all pipe notes down to fit sheets, which is usually 60 down (dl=,-60).

14. Visually inspect plan\profile sheets and make adjustments to all notes, as necessary for clarity.

15. In “Reference File” dialog, open “Reference Files” – “Settings” – “Levels” dialog for the survey strip map references (“DIMAP*”) and turn on the following levels. See CADD standards for level designation. Numbers in brackets [ ] represent the color the level is to be overridden to:

    a. 3 − Sign features [0],
    b. 7 − Generic planimetric features [32],
    c. 9 − Vegetation [32],
    d. 19 − Planimetric break lines [32],
    e. 22 − Natural water line features [32],
    f. 23 − Man-made water line features [32],
    g. 38 − Drainage [32], and
    h. 44 − Wetland boundary [32].

16. Open “Reference File” dialog and go to “Settings” – “Level Symbology” – “Color” and override levels to the colors shown in brackets [ ] listed above.

17. If other levels from the survey strip map are to be displayed and plotted, determine the color the particular level or levels should be and make the appropriate adjustments.

18. Repeat if more than one set of survey files are attached.

19. In “Reference File” dialog, open “Reference Files” – “Settings” – “Levels” dialog for the road design strip map references (“RDMAP*H”) and turn on the following levels. See CADD standards for level designation. Numbers in brackets [ ] represent the color the level is to be overridden to:

    a. 3 − Design C/L [0],
    b. 4 − Design C/L curve data, annotation [0],
    c. 5 − Detour C/L [32],
    d. 7 − Topography and topography text [32],
    e. 11 − Culverts, storm drains, irrigation features etc. [0],
    f. 13 − Approaches new [0],

g. 14 − Alternate and side street C/L [32],
h. 17 − North arrow [0],
i. 20 − New guardrail [0],
j. 21 − New sidewalk [0],
k. 22 − New curb and gutter [0],
l. 33 − Construction limits [0],
m. 41 − Utility conflict callouts [0],
n. 44 − Wetland boundary [32] if off in “DIMAP”,
o. 47 − Wetland hatching [32],
p. 48 − Wetland impacts boundary [32], and
q. 49 − Wetland impacts cross hatching [32].

20. Open “Reference File” dialog and go to “Settings” − “Level Symbology” − “Color” and override levels to the colors shown in brackets [ ] listed above.

21. If other levels from the road design strip map are to be displayed and plotted, determine the color the particular level or levels should be and make the appropriate adjustments.

22. In “Reference File” dialog, open “Reference Files” – “Settings” – “Levels” dialog for the right-of-way strip map references (“ROMAP*”) and turn on the following levels. See CADD standards for level designation. Numbers in brackets [ ] represent the color the level is to be overridden to:

a. 16 − Section lines [32],
b. 30 − Existing R/W lines [32],
c. 31 − Proposed R/W & Easement lines [0],
d. 34 − Property lines, lot lines [32],
e. 35 − Interior section lines [32],
f. 36 − Construction permit lines [0],
g. 38 − Proposed easement lines [0], and
h. 40 − Existing Railroad R/W lines [0].

23. Open “Reference File” dialog and go to “Settings” – “Level Symbology” − “Color” and override levels to the colors shown in brackets [ ] listed above.

24. In “Reference File” dialog, open “Reference Files” – “Settings” – “Levels” dialog for the right-of-way plan sheet references (“ROPLN*”) and turn on the following levels. See CADD standards for level designation. Numbers in brackets [ ] represent the color the level is to be overridden to:

a. 17 − Township & range callouts [0],
b. 19 − 1/16 section callouts, Government lots [0],

c. 23 − Railroad R/W stationing (for easement) [0],
d. 25 − Parcel numbers [0],
e. 27 − Railroad R/W dimensions [0],
f. 28 − Existing R/W & easement dimensions [0],
g. 29 − Existing R/W & easement callouts [0],
h. 32 − New R/W & easement callouts [0],
i. 33 − R/W +00 callouts [0],
j. 34 − Ownership dots [32],
k. 37 − Construction permit callouts [0],
l. 39 − Other easement text [0],
m. 43 − Access control information [0], and
n. 44 − Beg & end acquisition note [0].

25. Open “Reference File” dialog and go to “Settings” − “Level Symbology” − “Color” and override levels to the colors shown in brackets [ ] listed above.

26. In “Reference File” dialog, open “Reference Files” – “Settings” – “Levels” dialog for the utility SUE map references (“UTMAP*”) and turn on the following levels. See CADD standards for level designation. Numbers in brackets [ ] represent the color the level is to be overridden to:

a. 30 – Electrical [3] Red,
b. 31 – Gas [20] Gold,
c. 32 – Hazards, Misc. utilities [0] White,
d. 33 – Sanitary and Storm Sewer [2] Green,
e. 34 – Television [5] Purple,
f. 35 – Telephone [6] Orange, and
g. 36 – Water [1] Blue.

27. Open “Reference File” dialog and go to “Settings” − “Level Symbology” − “Color” and override levels to the colors shown in brackets [ ] listed above. It should be noted that gas lines should be shown in yellow, but when plotting on white sheets the yellow does not show well so the color gold is used instead.

28. Open “Reference File” dialog and go to “Settings” – “Update Sequence” and change update sequence as follows:

a. “Planm.ref” (“sht”) – plan sheet border,
b. “Utiplanm.ref” (“sht1”) – utility plan sheets,
c. “1234map1.fld” (“dimap*”) – survey strip maps,
d. “1234rdmap001.dgn” (“rdmap*h”) – road design strip map,
e. “1234romap001.dgn” (“romap*”) – R/W strip map,
f. “1234ropln001.dgn” (“ropln*”) – R/W plan sheets,

g. “1234rdmap001.dgn”(“rdmap*v*”) – road design profile,
h. “1234utsue001.dgn” (“utmap*”) – SUE or utility strip map, and
i. Active Design File.

29. Review the plans for clarity make appropriate changes or adjustments to the utility plans. It may be necessary to copy items from the various strip maps and/or plans then adjust for clarity or to reduce the amount of clutter to make the utility plans more readable. When items are copied into the active design file, it is necessary to turn off the level in the reference from where the item(s) originated. Care must be exercised when doing this so that other information is not turned off inadvertently.

30. Place utility conflict callouts on the utility plans. See **Section 28-2.8** for direction on how to identify the conflicts. Utility conflicts should be clearly labeled and placed on level 41 of the utility plan\profile sheets:

a. Lateral conflicts are called out by station range and placed on the utility plan sheet near the top of the plan portion of the utility plan. The note should identify the station range (beginning and ending station of the conflict), whether it is left, right, or on both sides of design centerline and the type of utility. This same note should be placed on each plan sheet where the utility in conflict exists.

b. Spot conflicts are called out by station and offset from the design centerline and placed as near as possible to where the utility in conflict exists. Spot conflicts are placed perpendicular to the design centerline and labeled with a circle around the utility with a leader line from it identifying the station and offset. To provide uniformity in the plan sheets, there are two cells (“CALLRT” & “CALLLT”) in the “utilityv8_0” cell library that should be used for labeling the spot conflicts.

c. Other conflicts are called out the same way as either lateral conflicts or spot conflicts dependent on circumstances or conditions and placed in a manner to clearly be seen on the plan sheets.

d. Utility crossing notes are usually placed by the Design Unit and should include design centerline crossing station, height of crossing or depth of bury, and number of wires or size of pipe or line, if known. Crossing notes should be placed near the top of page on level 9 in the plan\profile sheet file and should be checked for accuracy and completeness and modified if necessary.

e. Most conflicts are identified by the Design Unit and placed on level 41 in the Design Unit's strip map ("rdmap*h"). The labels in this strip map should be turned off after final conflicts are identified and placed in the plan\profile sheets.

31. It should be noted that by coping the "rd" workgroup plan\profile sheets pipe notes, elevations and other items from step 9, 13 & 14 will need to be updated if changes to the road design plan\profile sheets are made.

32. Copy shape from level 9 in "utiplanmv80" ("sht1") reference to active file making sure the shape remains on level 9 and line code 5. Copy only the shapes around the individual sheets to be plotted within the design file. This shape is needed for plotting using batch plot within Microstation.

28-2.8 Identifying Utility Conflicts

The utilities identified as conflicts on the utility plan\profile sheets are utility conflicts with respect to the construction limits and other construction related items. MDT's utility agents use the utility plans to meet with the individual utility companies and determine the extent of each utility companies involvement with the construction project. Right-of-way, both existing and new, needs to be identified prior to the utility PIH to determine involvement with respect to private easement, highway R/W and necessary room for relocating the affected utility. Consider the following:

1. Lateral conflicts. Lateral conflicts are defined as those utilities that traverse laterally or parallel to the existing roadway. The utilities involved are typically underground utilities such as telephone, fiber cable, gas, etc. The utility can be on one side or both sides of the roadway with various crossings. To identify the conflict:

   Open utility map file ("1234utsue001.dgn") and make sure the latest road design strip map with construction limits is attached and level 33 is turned on.

   Identify where the utility first crosses into the construction limits and then follow utility and determine where the utility last crosses out of the construction limits. Note whether this is left, right or on both sides of the design centerline.

   If the utility crosses in and out or weaves through the construction limits, short segments should be combined into one note. As a general rule, gaps less than 200 ft (60 m) in length can be combined.

If a pedestal is located just prior to or just after the utilities lateral conflict, adjust the lateral conflict extending it to the pedestal or pedestals.

Go to the utility plan\profile sheets and place a note indicating the conflict. See step 30 of utility plan\profile sheets procedure. See **Section 28-2.7**.

2. Spot conflicts. Spot conflicts are defined as a conflict existing at a specific location. The utilities typically involved include power, telephone, san sewer, etc. and are usually poles, pedestals, manhole covers, etc. The conflict is called out by station and offset from design centerline. To identify the conflict:

   Open the utility plan\profile sheets ("1234utplp00*") making sure the latest road design strip map file is attached and construction limits (lv.33) and the utility conflicts (lv.41) are turned on.

   Visually inspect the plan sheets for pedestals, poles, etc. that are inside the construction limits. When conflicts are found, place cell ("CALLLT" or "CALLRT") from the "utilityV8_0" cell library perpendicular to centerline and identify the conflict and its relationship to design centerline by station and offset.

   If the conflict is called out in the road design strip map, the station and offset can be copied from it once checked for accuracy. If the conflict is not included in the design map, then a station and offset will need to be measured from the design centerline.

   Station callouts should be rounded to the nearest 3 ft (1 m) and offset distances to the nearest 0.5 ft (0.1 m).

   Visually inspect the plan\profile sheets for conflicts with other construction items such as ditches, approaches, pipes, etc. that may cause a conflict with the utilities. Identify these conflicts using the method describe above.

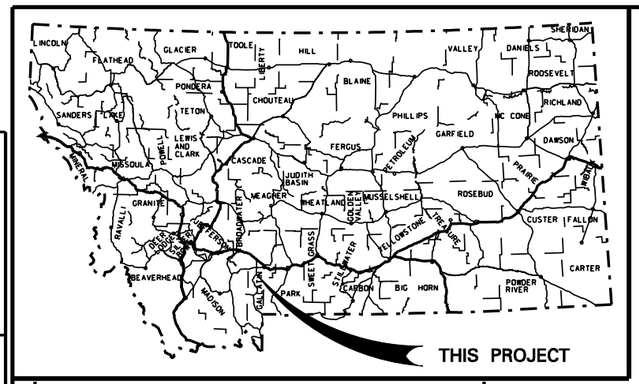
3. Other Conflicts. Other conflicts can be defined as utilities having conflicts with the construction project but are not defined as either a lateral or spot conflict. Examples might be a telephone cable attached to an existing bridge that is to be replaced, or a gas line running down a county road to be resurfaced but bid as lump sum, with construction limits not computed or shown. These conflicts should be shown in the utility plan sheets and good judgment exercised when defining them, either like a lateral or spot callout.

4. Utility Crossings. Utility crossings may or may not be defined as a conflict but in either case will be called out on the utility plans. Overhead utility crossings should be called out by the station the utility crosses the design centerline, the

number of wires at the crossing and the clearance measured from the centerline of the existing roadway to the lowest wire. If the information is unknown, it should be stated as unknown in the utility crossing note. Underground utility crossings should be called out by the station the utility crosses the design centerline, the depth the utility is buried from the existing roadway to the top of the utility and the number of wires or cables, if known. Underground gas, water, sewer, duct systems, etc. should include the station the utility crosses design centerline, the depth the utility is buried from the existing roadway to the top of utility and the size of utility, if known. See Chapter 22 and Section 4.3.10.4(8) of the ***Road Design Manual*** for correct placement of utility crossing notes. Utility crossings also need to be depicted on the cross sections. See Section 4.3.11.2(2) and Figure 4.4 T-1 of the ***Road Design Manual***.

28-2.9 Example Plan Sheets

The following figures (11 in X 17 in sheets) are provided as a visual aid for the preparation of the utility plans package. They are from various projects and are representative of a typical utility plans package.



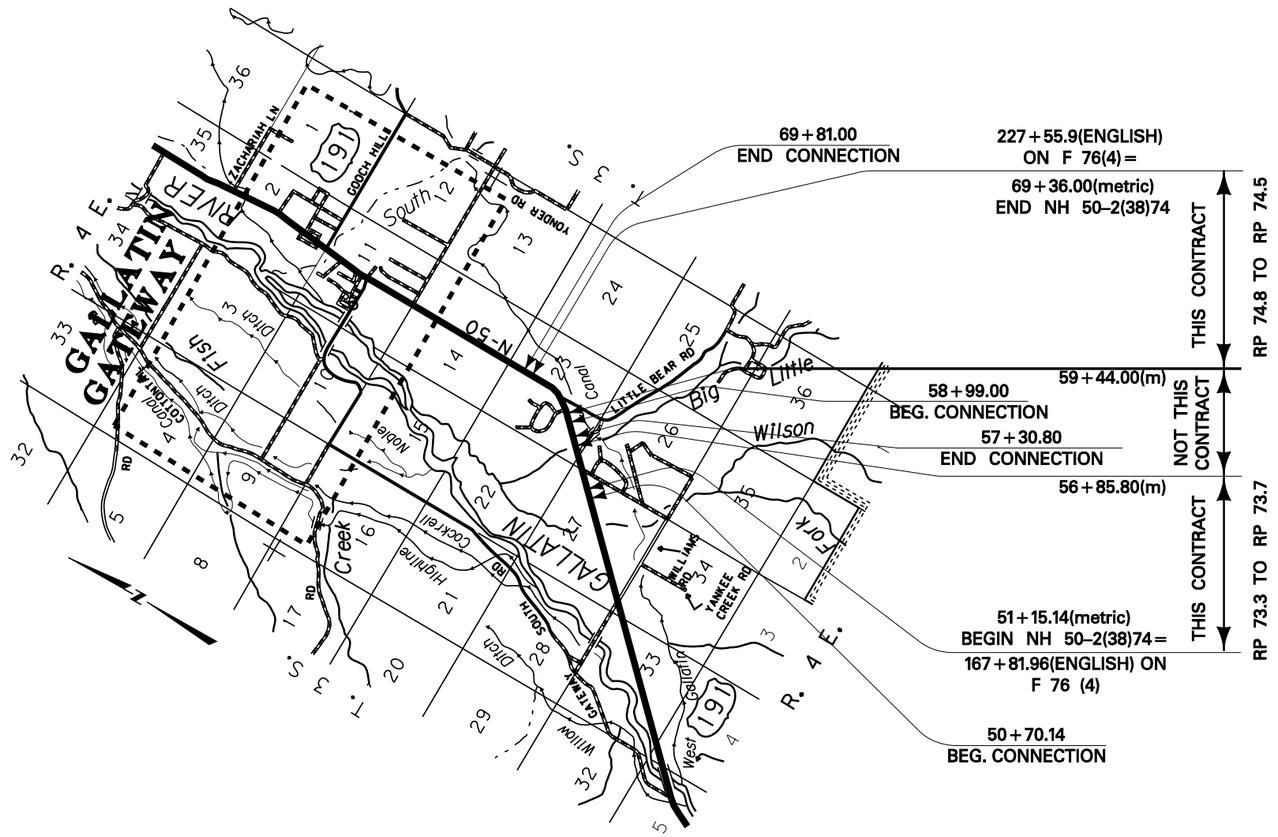
MONTANA DEPARTMENT OF TRANSPORTATION

DESIGN DATA	
1999 A.D.T. =	4540
2019 A.D.T. =	9040
D.H.V. =	990
T. =	9.3%
V. =	110 km/h
ESAL'S =	349.28 D
GROWTH RATE =	3.5 ANNUALLY

LETTING DATE – _____

UTILITY PLAN OF FEDERAL AID PROJECT NH 50–2(38)74 TURNBAYS – SOUTH OF GALLATIN GATEWAY

GALLATIN COUNTY
1.6 Kilometers



PLAN LEGEND

- CENTERLINE (℄) OR PROJECTED LINE
- PROPOSED RIGHT OF WAY LINE
- EXISTING RIGHT OF WAY LINE
- RAILROAD RIGHT OF WAY LINE
- EXISTING ACCESS CONTROL
- FULL ACCESS CONTROL (AC)
- LIMITED ACCESS CONTROL
- OWNERSHIP BOUNDARY
- SECTION LINE
- SECTION CORNER (FOUND / UNFOUND)
- ¼ SECTION CORNER (FOUND / UNFOUND)
- RIGHT OF WAY MONUMENT
- PROPERTY CORNER PIN
- PARCEL NUMBERS (2)
- PRESENT TRAVELED WAY (P.T.W.)
- APPROACH: EXIST.- PROPOSED
- FENCE LINE
- GATE IN FENCE
- CATTLE GUARD: EXIST. - PROPOSED
- BRIDGES
- RAILROADS
- EXISTING GUARDRAIL
- PROPOSED GUARDRAIL
- EXISTING DITCH
- CHANNEL CHANGES
- EXISTING CULVERT
- PROPOSED CULVERT
- OUTLET DITCH
- INLET DITCH
- POWER POLE IN PLACE (W/ ANCHOR)
- TELEPHONE POLE IN PLACE
- LIGHT POLE - GUY POLE
- PEDESTALS (POWER FP, TEL TP)
- MANHOLES (UNKNOWN, ELEC, STORM, SAN, TEL)
- VALVES (WATER WV, GAS GV)
- FIRE HYDRANT
- FIBER CABLE (UNDERGROUND FO)
- GAS (UNDERGROUND GAS)
- POWER (OVERHEAD PWR, UNDERGROUND PWR)
- TELEPHONE (OVERHEAD TEL, UNDERGROUND TEL)
- TELEVISION (OVERHEAD TV, UNDERGROUND TV)
- WATER (EXISTING, PROPOSED)
- SANITARY SEWER (EXISTING SAN, PROPOSED SAN)
- UTILITY POLES IN POSSIBLE CONFLICT

ASSOCIATED PROJECT ID.

RELATED PROJECTS
F76(4)
NH 50-2(29)70

FHWA/MDT APPROVAL_____
MAP REVISED_____

UTILITIES
MONTANA CADD
DESIGNED BY
REVIEWED BY
CHECKED BY
$FILEABBREV$
$DATE$
$TIME$
lay sht $user name$

Fig. 1. 1

TITLE SHEET

Figure 28-6

TABLE OF CONTENTS

UTILIITY PLANS — SHEET NO.

TITLE SHEET U1
TABLE OF CONTENTS U2
CLEAR ZONE NOTE U2
NOTES U2
BEARING SOURCE & LEVEL DATUM SOURCE
CENTERLINE COORDINATE TABLE . . U2
CONTROL DIAGRAM
AND ABSTRACT TABLE U3
OWNERSHIPS U4
TYPICAL SECTIONS . . . . U5 - U7

DETAILS
RUMBLE STRIPS U8
PIPE DETAILS U9
GEOMETRIC DETAILS . . . . . U10 - U15

PLAN & PROFILE
MAINLINE . . . . . U16 - U19

CROSS SECTIONS
MAINLINE 1-36

NOTES

BASIS OF PLAN QUANTITIES

(QUANTITIES FOR ESTIMATING PURPOSES ONLY)

COMP. AGGREGATE WEIGHT = 2200 kilograms per cubic meter
COMP. WEIGHT OF PL. MIX BIT. SURF. = 2287 kilograms per cubic meter
ASPHALT CEMENT = 6.0% OF PL. MIX BIT. SURF.
BITUMINOUS MATERIAL = 1.02 kilograms per meter
HYDRATED LIME = 1.4% OF PL. MIX BIT. SURF.
DUST PALLIATIVE = 1.3 kilograms per liter
AGGREGATE TREATMENT
DUST PALLIATIVE = 1.4 liters per square meter
AGG. TACK = 0.23 liters per square meter (undiluted)
TACK = 0.12 liters per square meter (undiluted)
SEAL = 1.8 liters per square meter
COVER = 14.0 kilograms per square meter

APPROACHES

CONSTRUCT APPROACHES TO A 7.2 m FINISHED TOP ON A 10.6 m SUBGRADE UNLESS NOTED OTHERWISE IN THE PLANS.

PROVIDE THE FOLLOWING SURFACING:
60 mm PLANT MIX BITUMINOUS SURF.
190 mm CRUSHED AGG. COURSE

PLANT MIX SURFACE ALL PUBLIC & PRIVATE APPROACHES TO R/W.

QUANTITIES FOR ONE PUBLIC & PRIVATE APPROACH:

AVERAGE LENGTH	=	19 meters
PLANT MIX BITUMINOUS SURF.	=	23 tons
ASPHALT CEMENT	=	1.2 tons
DUST PALLIATIVE	=	0.2 tons

GRAVEL SURFACE ALL FARM FIELD APPROACHES TO R/W WITH A 3.6 m WIDE PLANT MIX STRIP ADJACENT AND PARALLEL TO THE ROADWAY.

QUANTITIES FOR ONE FARM FIELD APPROACH:

AVERAGE LENGTH	=	3.6 meters
PLANT MIX BITUMINOUS SURF.	=	6 tons
ASPHALT CEMENT	=	0.3 tons
DUST PALLIATIVE	=	0.1 tons

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM EXISTIN GROUND LINES.

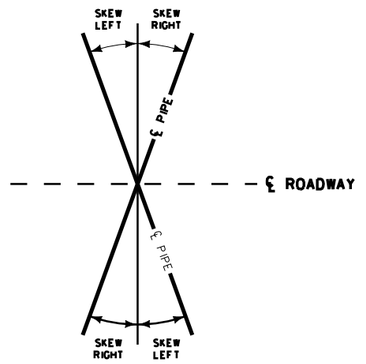
TEMPORARY EROSION AND SEDIMENT CONTROL

REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS (2002 METRIC EDITION) FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES.

CLEAR ZONE

THE CLEAR ZONE OF THIS PROJECT IS 9 meters FROM THE EDGE OF TRAVEL LANE. IF PRACTICAL, LOCATE UNSHIELDED OBSTACLES BEYOND THE CLEAR ZONE.

SKEW DIAGRAM



ELEVATIONS ON CROSS SECTIONS

CENTERLINE ELEVATIONS ON CROSS SECTIONS ARE THE EXISTING CENTERLINE ELEVATIONS.

LINEAR AND LEVEL DATA

LENGTH OF ROADWAY	GALLATIN COUNTY		1 562.66 m
LENGTH OF BRIDGE	GALLATIN COUNTY		0.00 m
TOTAL LENGTH OF		NH 50-2(38)74	1 562.66 m

BEARING SOURCE AND LEVEL DATUM SOURCE

GPS DERIVED

TOTAL SHEETS 19
SHEET NUMBER U2
CONTROL NO. 4008
TURNBAYS - GALLATIN GATEWAY
NH 50-2(38)74
UTILITY PLAN
GALLATIN COUNTY
SCALE 1:1000 100M 50M 0

UTILITIES
MONTANA DEPARTMENT OF TRANSPORTATION
MONTANA CADD

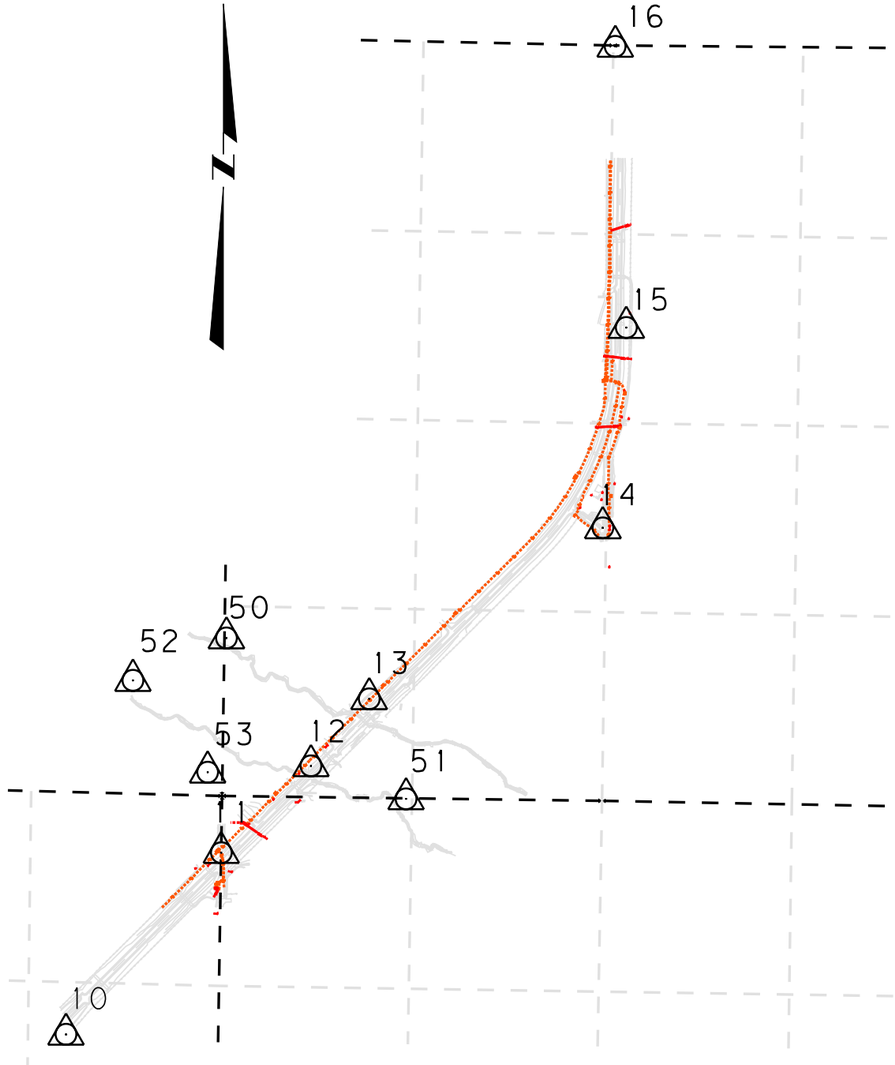
$FILEABBREV$ DESIGNED BY
$DATE$ REVIEWED BY
$TIME$ CHECKED BY
$username$

MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride

Fig. 2.1

TABLE OF CONTENTS, NOTES

Figure 28-7



GPS CONTROL DIAGRAM

NOT TO SCALE

GPS CONTROL ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
10	145 955.4740	466 407.6140	1548.747	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-A 2000" MP 74.2 25m RT
11	146 341.1500	466 747.4040	1547.274	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-B 2000" MP 74.5 16m LT
12	146 525.4590	466 927.8580	1550.040	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-C 2000" MP 74.7 12m LT
13	146 646.7830	467 051.9560	1552.532	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-D 2000" MP 74.8 10m LT
14	147 030.9440	467 547.8610	1558.478	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-A 2000" MP 74.1 80m RT
15	147 456.0250	467 597.8630	1551.095	SET A 50mm MDOT ALUMINUM CAP STAMPED "74-B 2000" MP 74.4 18m RT
16	148 053.0260	467 574.4350	0.000	SET A 12mm SPIKE FOR TRAVERSE POINT
50	146 797.0100	466 748.4550	1545.375	SET A 12mm SPIKE FOR TRAVERSE POINT
51	146 455.4980	467 129.9690	1554.814	SET A 12mm SPIKE FOR TRAVERSE POINT
52	146 707.0920	466 549.7220	1539.896	SET A 12mm SPIKE FOR TRAVERSE POINT
53	146 512.1410	466 708.6860	1545.802	SET A 12mm SPIKE FOR TRAVERSE POINT

CENTERLINE COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
48+06.90	POT	145 990.9304	466 407.7978	
62+65.98	SC	147 022.1659	467 439.9248	
64+49.08	PI	147 161.4150	467 558.8266	
66+20.70	CS	147 343.6932	467 576.2220	
67+83.56	POT	147 506.4360	467 581.0784	
71+00.00	POT	147 822.8435	467 585.6116	

NOTE:
CSF = 0.99946874

UTILITIES — MONTANA DEPARTMENT OF TRANSPORTATION — MONTANA CADD

DESIGNED BY
REVIEWED BY
CHECKED BY
$FILEABBREV$
$DATE$
$TIME$
$usernames$

TURNBAYS – GALLATIN GATEWAY
NH 50-2(38)74
CONTROL NO. 4008
SHEET NUMBER U3
TOTAL SHEETS 19

UTILITY PLAN
GALLATIN COUNTY
SCALE 1:1000
0 50M 100M

MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride

Fig. 3.1

GPS CONTROL DIAGRAM

Figure 28-8

OWNERSHIP

PARCEL	NAME	ADDRESS	TOTAL AREA		GROSS R/W AREA		EX. EASE. AREA		NET AREA		REMAINDER				CONST. PMT. AREA		EASE. AREA		SHEET NO.
			METRIC	ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	LEFT		RIGHT						
											METRIC	ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	
1	TURNER ENTERPRISES, INC.	P.O. BOX 190, GALLATIN GATEWAY, MT 59730-0910		640+ AC	0.176 ha	0.43 AC			0.176 ha	0.43 AC		640+ AC							U16, U17
2	WILLIS R. & NORMA J. DANIEL	16949 WILSON CREEK ROAD	40.266 ha	99.50 AC	0.220 ha	0.54 AC			0.220 ha	0.54 AC			40.046 ha	98.96 AC					U16, U17
		GALLATIN GATEWAY, MT 59730-9704																	
3	WAYNE M. & CAROLYN McPHEETERS	115 KLEINSCHMIDT CANAL DRIVE	2.023 ha	5.00 AC	0.096 ha	0.24 AC			0.096 ha	0.24 AC			1.927 ha	4.76 AC					U17
		GALLATIN GATEWAY, MT 59730-9750																	
4	RAYMOND L. & CHRISTINE C. CARPENTER	875 ARLINGTON AVE., BERKELEY, CA 94707-1926	2.052 ha	5.07 AC	0.054 ha	0.13 AC			0.054 ha	0.13 AC			1.998 ha	4.94 AC					U17
5	GARY BILOTTI & DARYL MONROE-BILOTTI	77 LITTLE BEAR ROAD WEST	FOR OWNER NOTIFICATION ONLY																U17
		GALLATIN GATEWAY, MT 59730-9719																	
6	LEE L. & SANDRA L. HART	73800 GALLATIN ROAD	21.226 ha	52.45 AC	0.216 ha	0.53 AC			0.216 ha	0.53 AC			21.010 ha	51.92 AC					U17, U18
		GALLATIN GATEWAY, MT 59730-9706																	
7	DAVID F. & DENISE E. BANDEROB	3108 CONESTOGA WAY, BILLINGS, MT 59105-4602	FOR OWNER NOTIFICATION ONLY																U17
8	JOE E. & MARCIA L. BANDEROB	75 TWO BEAR WAY	1.429 ha	3.53 AC	0.024 ha	0.06 AC			0.024 ha	0.06 AC	1.405 ha	3.47 AC							U17
		GALLATIN GATEWAY, MT 59730-9736																	
9	GARY & LISA GRAMER	140 LOW BENCH ROAD	1.873 ha	4.63 AC	0.083 ha	0.21 AC			0.083 ha	0.21 AC	1.790 ha	4.42 AC							U17, U18
		GALLATIN GATEWAY, MT 59730-9755																	
10	BOBBY D. & ROBBIN M. SMITH	3109 AUGUSTA DRIVE, BOZEMAN, MT 59715	0.720 ha	1.78 AC	0.003 ha	0.01 AC			0.003 ha	0.01 AC	0.717 ha	1.77 AC							U18
11	DANIEL & KAREN CAVE	14935 LOW BENCH ROAD	FOR OWNER NOTIFICATION ONLY																U18
		GALLATIN GATEWAY, MT 59730																	
12	DON T. & ALICE R. WILSON	14965 LOW BENCH ROAD	FOR OWNER NOTIFICATION ONLY																U18
		GALLATIN GATEWAY, MT 59730																	
13	DARRELL B. & GENEVA C. FRIEND	15015 LOW BENCH ROAD	1.271 ha	3.14 AC	0.046 ha	0.11 AC			0.046 ha	0.11 AC	1.225 ha	3.03 AC							U18
		GALLATIN GATEWAY, MT 59730-9727																	
14	ROBERT A. & MARTHA F. McREE	184 ROLAND ROAD, THOMASTON, GA 30286-7600	1.251 ha	3.09 AC	0.046 ha	0.11 AC			0.046 ha	0.11 AC	1.205 ha	2.98 AC							U18
15	SCOTT A. & BARBARA J. ELLESTAD	14865 CINNAMON BEAR CT	1.582 ha	3.91 AC	0.044 ha	0.11 AC			0.044 ha	0.11 AC	1.538 ha	3.80 AC							U18, U19
		GALLATIN GATEWAY, MT 59730-9746																	
16	WILLIAM & GLENNA M. deRHAM	300 N. WILSON AVE, SUITE 3005	FOR OWNER NOTIFICATION ONLY																U18, U19
		BOZEMAN, MT 59715-3551																	
17	JAMES H. & GAIL G. WALMA	13825 COUNTY ROAD #7, MEEKER, CO 81641-9720	8.101 ha	20.02 AC	0.002 ha	0.01 AC			0.002 ha	0.01 AC	8.099 ha	20.01 AC							U19
18	MICHAEL M. deRHAM	15433 COUNTRY CLUB DRIVE, APT E205	FOR OWNER NOTIFICATION ONLY																U19
		MILL CREEK, WA 98012-1749																	
19	STEPHEN L. deRHAM	4608 SW SEATTLE ST, SEATTLE, WA 98116-1641	FOR OWNER NOTIFICATION ONLY																U19
20	THE CHURA FAMILY LIMITED PARTNERSHIP	2413 MARONEY AVE, LAS VEGAS, NV 89104-3473	FOR OWNER NOTIFICATION ONLY																U19
21	WILLIAM & GLENNA M. deRHAM	300 N. WILSON AVE, SUITE 3005	FOR OWNER NOTIFICATION ONLY																U19
		BOZEMAN, MT 59715-3551																	
22	SARAH A. BABCOCK	P.O. BOX 676, LOLO, MT 59847-0676	FOR OWNER NOTIFICATION ONLY																
23	ELAINE MARIE REARDON	74650 GALLATIN ROAD	FOR OWNER NOTIFICATION ONLY																
		GALLATIN GATEWAY, MT 59730-9702																	

UTILITIES

MONTANA CADD

MONTANA DEPARTMENT OF TRANSPORTATION

$FILEABBREV$ DESIGNED BY
$DATE$ REVIEWED BY
$TIME$ CHECKED BY
$ $username$

GRID STATE PLANE COORDINATES

THIS IS A STATE PLANE COORDINATE PROJECT. ALL DIMENSIONS, DISTANCES AND AREAS ON THIS PROJECT ARE GRID, EXCEPT FOR THE EXISTING R/W WIDTH DIMENSION, WHICH IS RECORD. THE COMBINATION SCALE FACTOR IS 0.99946873

NOTES:
1. ALL MEASUREMENTS ARE METRIC EXCEPT AS NOTED
2. THE PROPOSED R/W LINE WHERE A SPIRAL CURVE TRANSITION IS USED IS A CHORD RATHER THAN A CONCENTRIC CURVE.
3. THE ENGLISH AREAS ARE FOR INFORMATIONAL PURPOSES ONLY.
4. ALL STATIONS AND OFFSETS FOR R/W BREAKS ARE IN REFERENCE TO THE R/W BASELINE.

BACKSLOPE LIMITS INCLUDE ROUNDING
CONSTRUCTION LIMITS: CUT SECTION — TOP OF CUT, DITCH BOTTOM; TOE OF FILL

FHWA/DOT APPROVAL _____

MAP REVISED _____

TOTAL SHEETS 19
SHEET NUMBER U4
TURNBAYS S.GALLATIN GATEWAY
CONTROL NO. 4008
NH 50-2(38)74

UTILITY PLAN
GALLATIN COUNTY
SCALE 1:1000
0 50M 100M

MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride

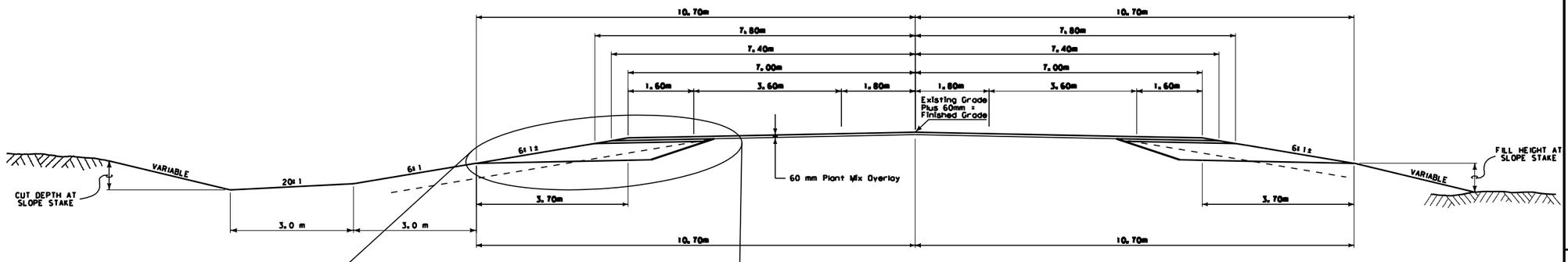
Fig. 4. 1

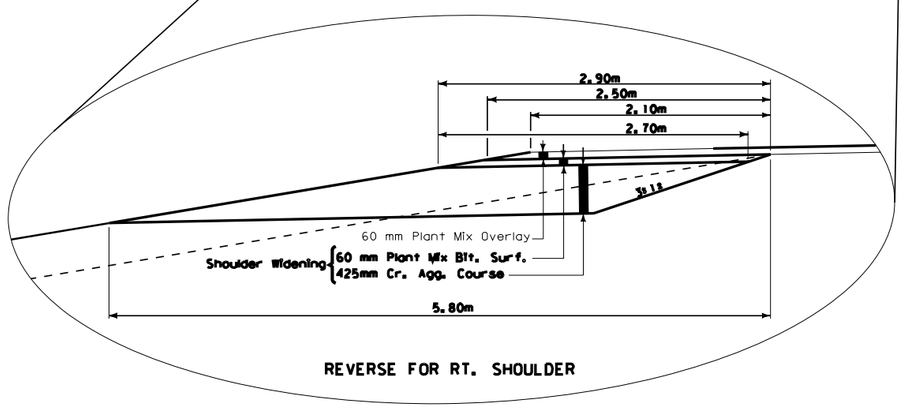
OWNERSHIP SHEET

Figure 28-9

TYPICAL SECTION NO. 2

STA. 52+41.14 TO 55+59.80
STA. 55+59.80 TO 56+85.80 TRANSITION FROM TYP. NO. 2 TO TYP. NO. 1
STA. 60+70.00 TO 61+65.98 TRANSITION FROM TYP. NO. 2 TO TYP. NO. 3
STA. 67+14.45 TO 68+10.00
STA. 68+10.00 TO 69+36.00 TRANSITION FROM TYP. NO. 2 TO TYP. NO. 1





REVERSE FOR RT. SHOULDER

DESIGN R VALUE = 30

OVERLAY QUANTITIES

UNIT	AGGREGATE					UNIT	BITUMINOUS MATERIAL				
	COVER	PLANT MIX					ASPHALT CEMENT		SEAL	TACK	
AREA square meters		0.086				square meters PER STATION			1400	1480	
cubic meters PER STATION		86.40				tons PER STATION	10.08		2.57		
tons PER STATION	19.6	197.6				liters PER STATION				340	

SHOULDER WIDENING QUANTITIES (INCLUDES BOTH SHOULDERS)

UNIT	AGGREGATE					UNIT	BITUMINOUS MATERIAL				
		PLANT MIX		CR. AGG. COURSE			ASPHALT CEMENT	PRIME			
AREA square meters		0.312				square meters PER STATION					
cubic meters PER STATION		31.2		296		tons PER STATION	3.64	0.77			
tons PER STATION		71.4				liters PER STATION					

Fig. 5.1

UTILITIES
MONTANA CADD
MONTANA DEPARTMENT OF TRANSPORTATION

$FILEABBREV$ DESIGNED BY
$DATE$ REVIEWED BY
$TIME$ CHECKED BY
$username$

TOTAL SHEETS 19
SHEET NUMBER U6
TURNBAYS - GALLATIN GATEWAY
CONTROL NO. 4008
NH 50-2(38)74

UTILITY PLAN
GALLATIN COUNTY
SCALE 1:1000
0 50M 100M

MONTANA DEPARTMENT OF TRANSPORTATION
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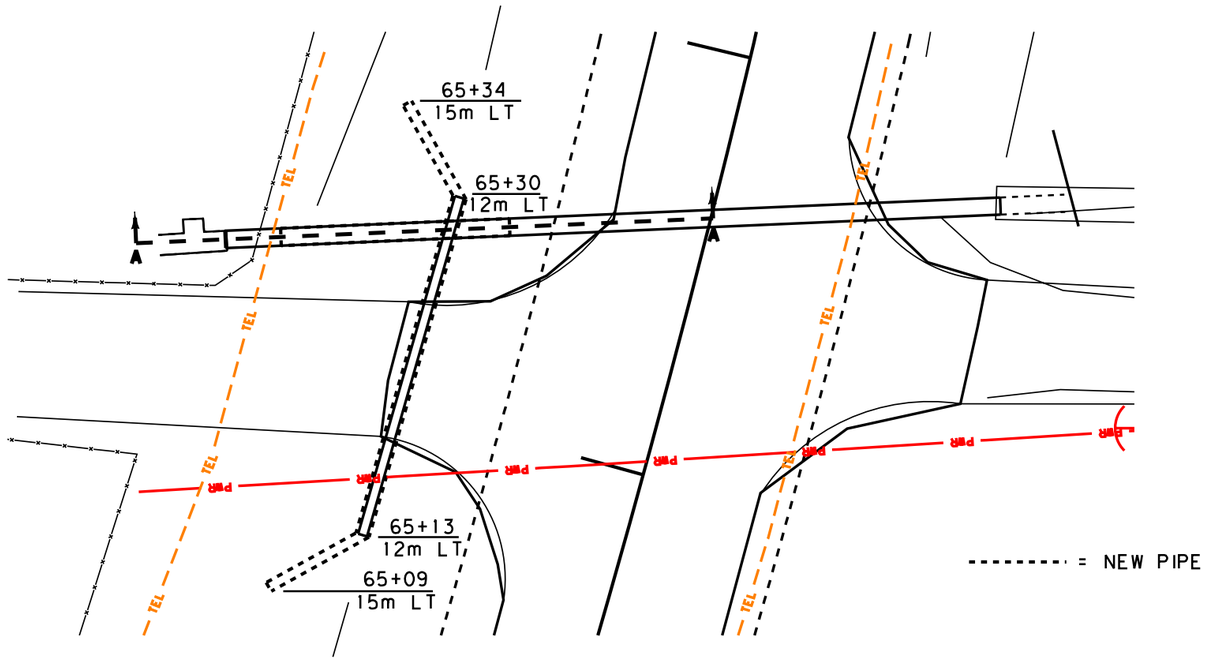
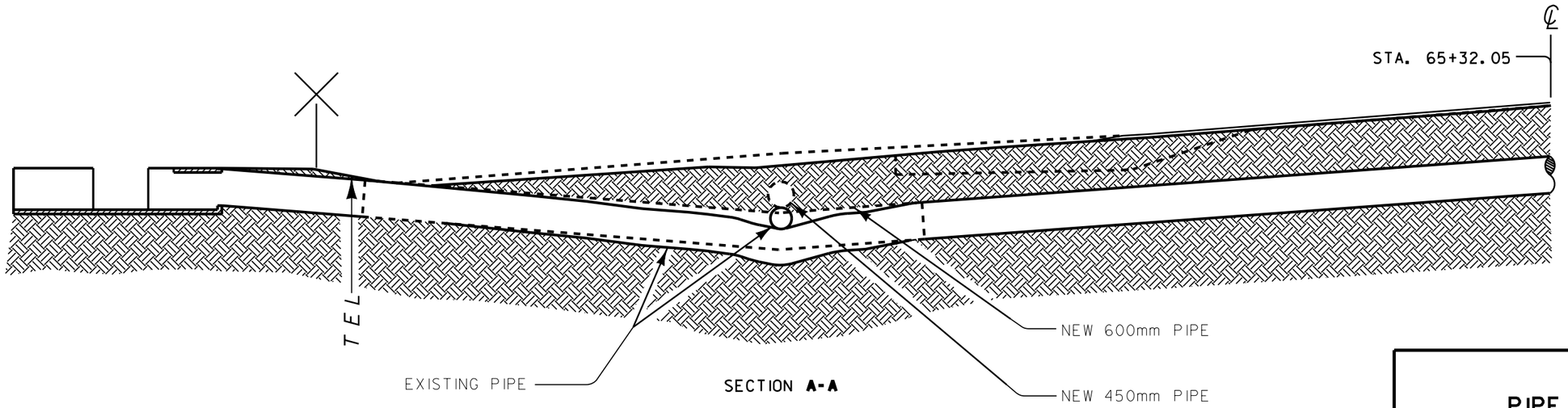
TYPICAL SECTION

Figure 28-10





UTILITIES

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

$FILEABBREV$
$DATE$
$TIME$
$username$

DESIGNED BY
REVIEWED BY
CHECKED BY

TURNBAYS – GALLATIN GATEWAY
NH 50-2(38)74
CONTROL NO. 4008
SHEET NUMBER U9
TOTAL SHEETS 19

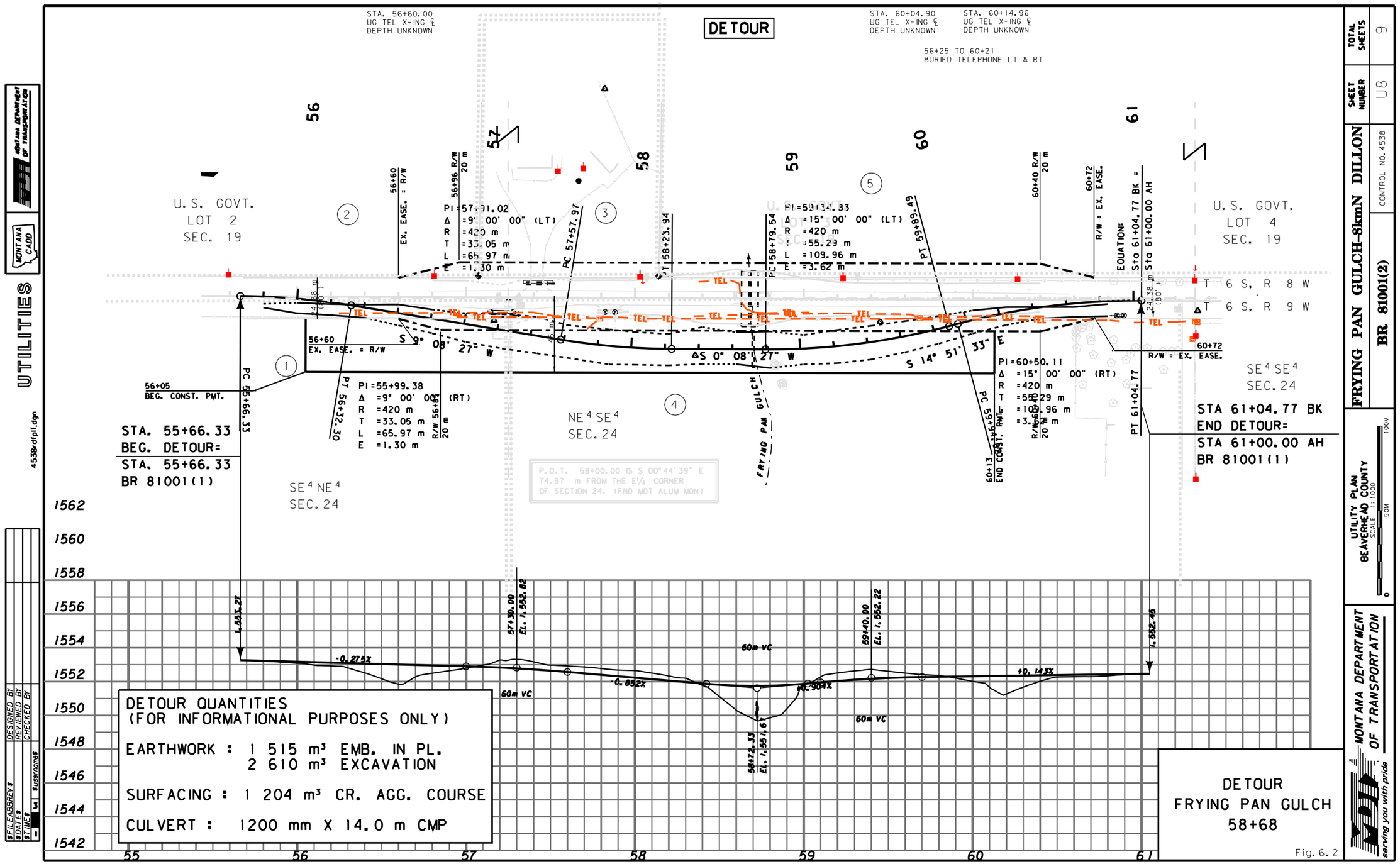
UTILITY PLAN
GALLATIN COUNTY
SCALE 1:1000
0 50M 100M

MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride

PIPE DETAILS
NOT TO SCALE
Fig. 6.1

DETAIL SHEET 1

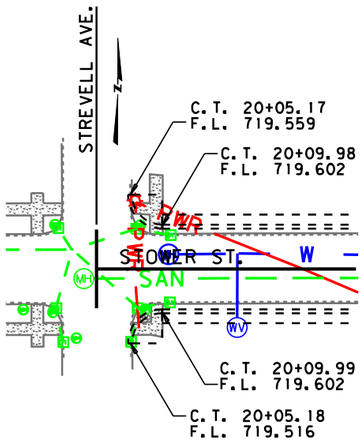
Figure 28-11

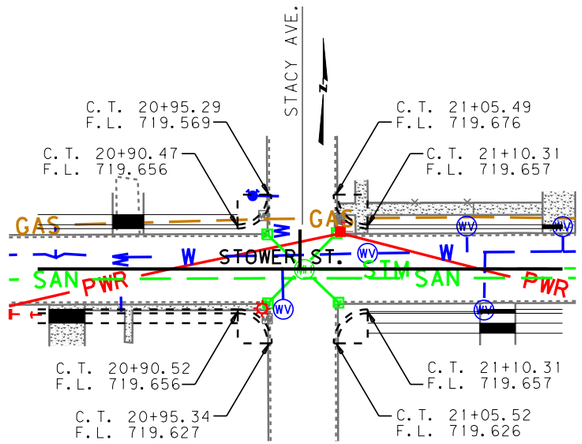


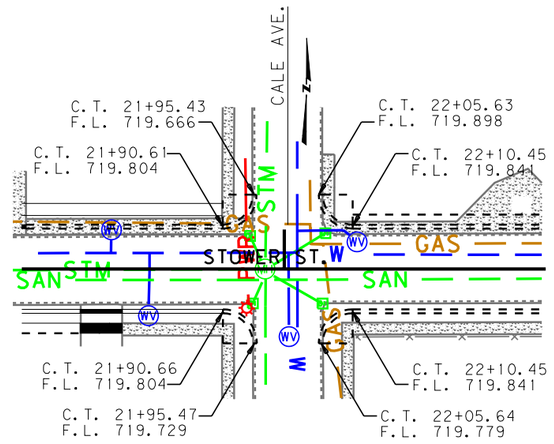
DETAIL SHEET 2

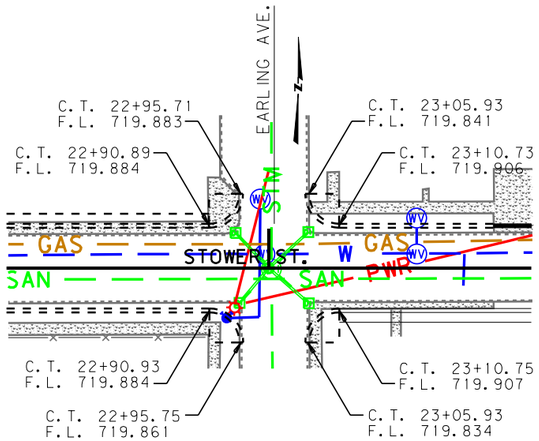
Figure 28-12

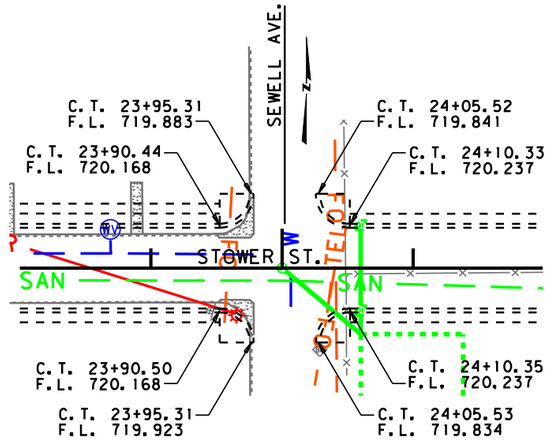
DETAIL

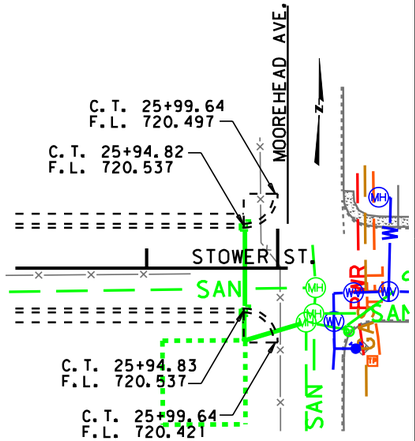












NOTE:

F. L. = FLOW LINE POINT
C. T. = CURB TURN POINT
4.575 m TURN RADII (BACK OF CURB)
UNLESS OTHERWISE NOTED

NO SCALE

INTERSECTION DETAIL

Fig. 6. 3

UTILITIES

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

FILE ABBREV'S
DESIGNED BY
DRAWN BY
CHECKED BY
STAKES
STYLES
$username$

STOWER STREET – MILES CITY
STPU 8009(2)
CONTROL NO. 4363
SHEET NUMBER U8
TOTAL SHEETS 14

UTILITY PLAN
CUSTER COUNTY
SCALE 1: 1000
0 50M 100M

MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride

DETAIL SHEET 3

Figure 28-13

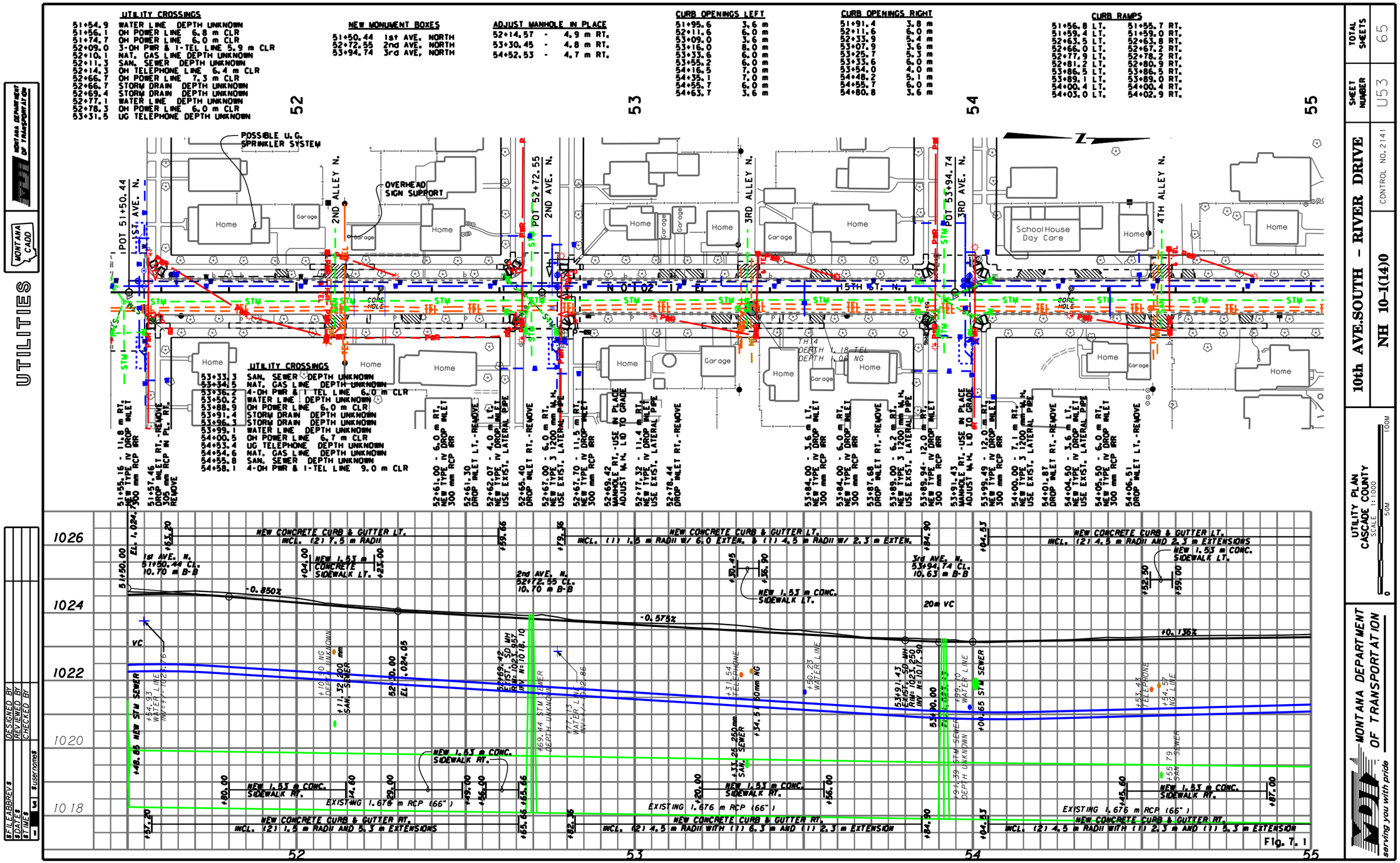
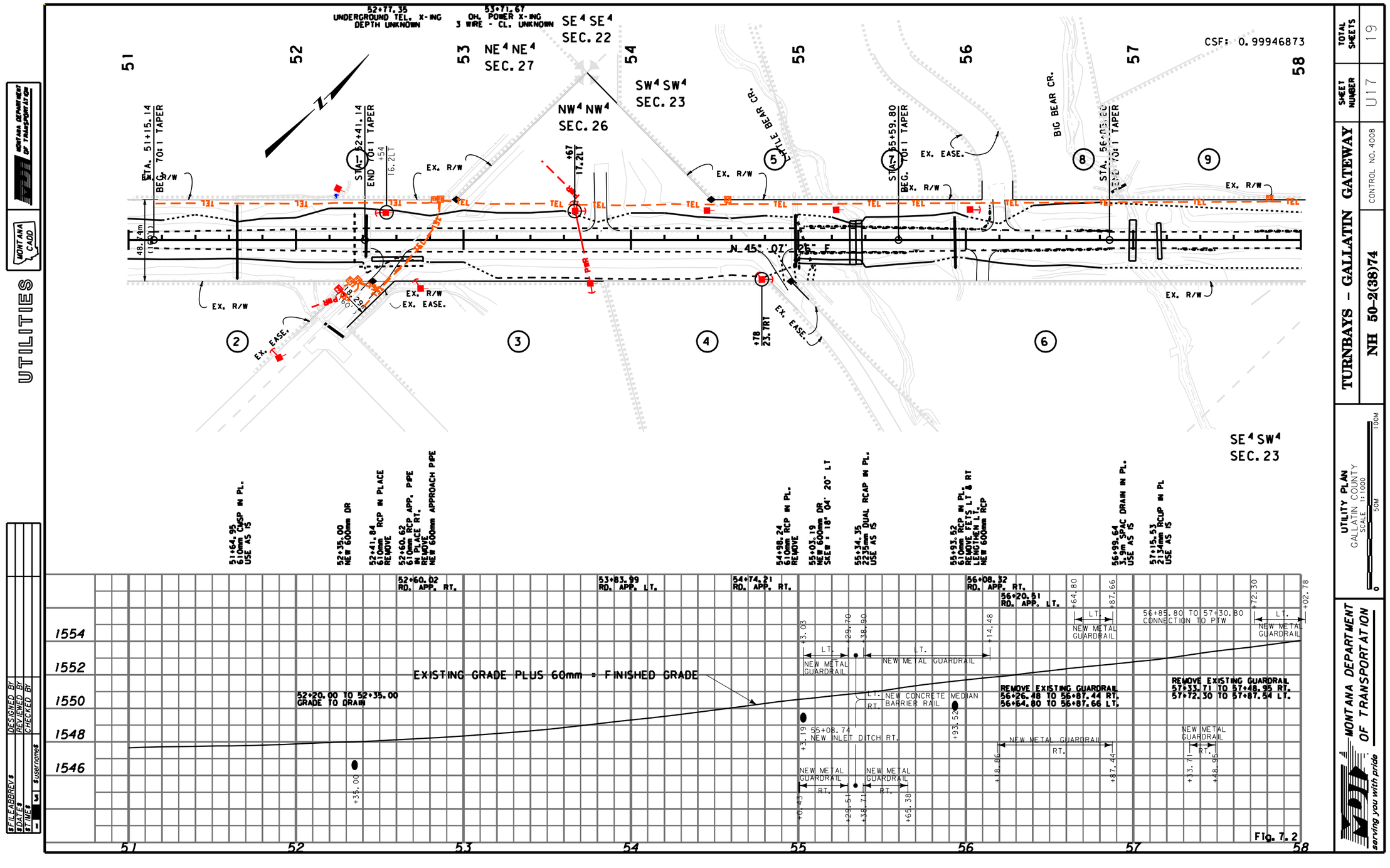


Fig. 7.1

PLAN/PROFILE SHEET 1

Figure 28-14



PLAN/PROFILE SHEET 2

Figure 28-15

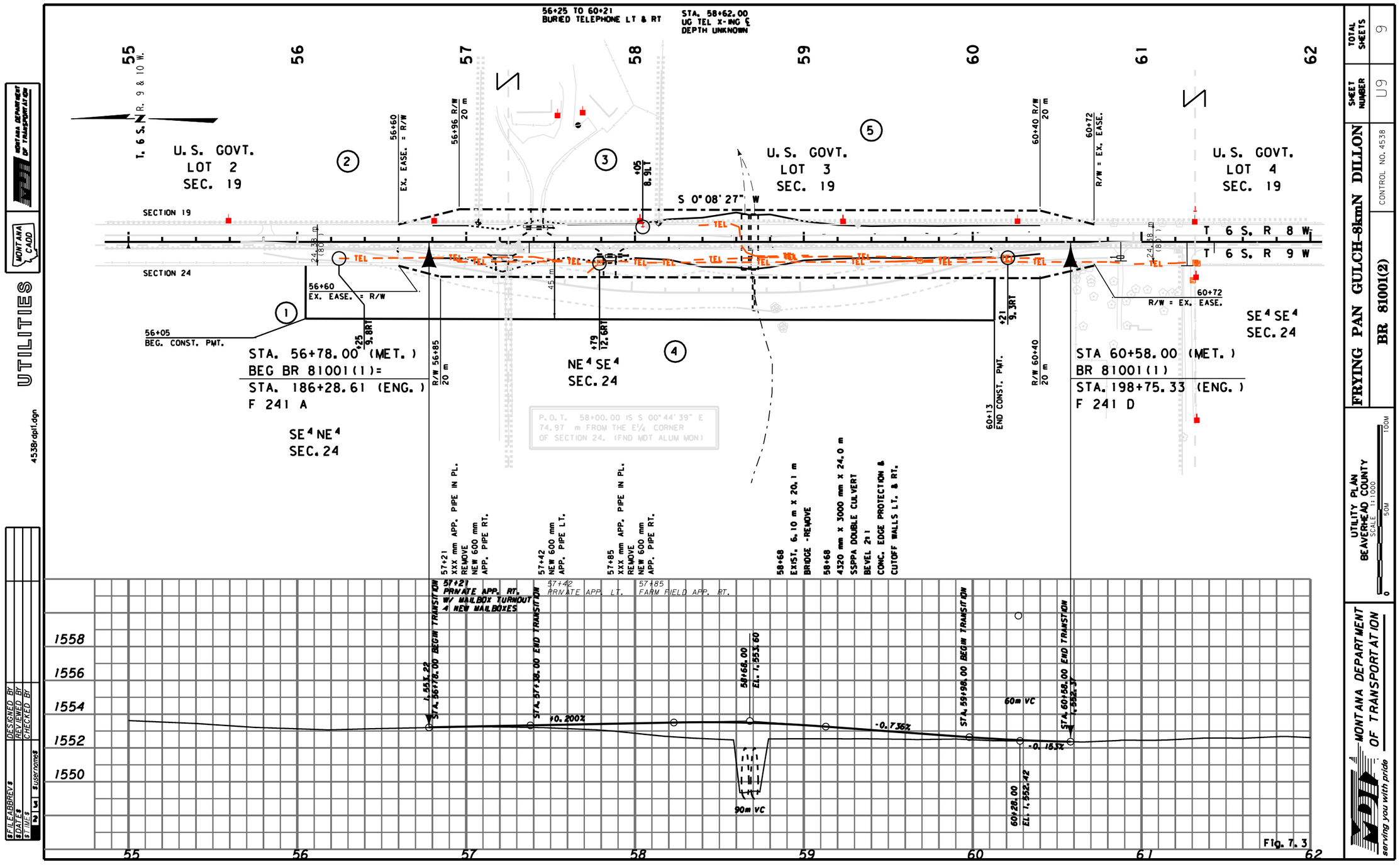
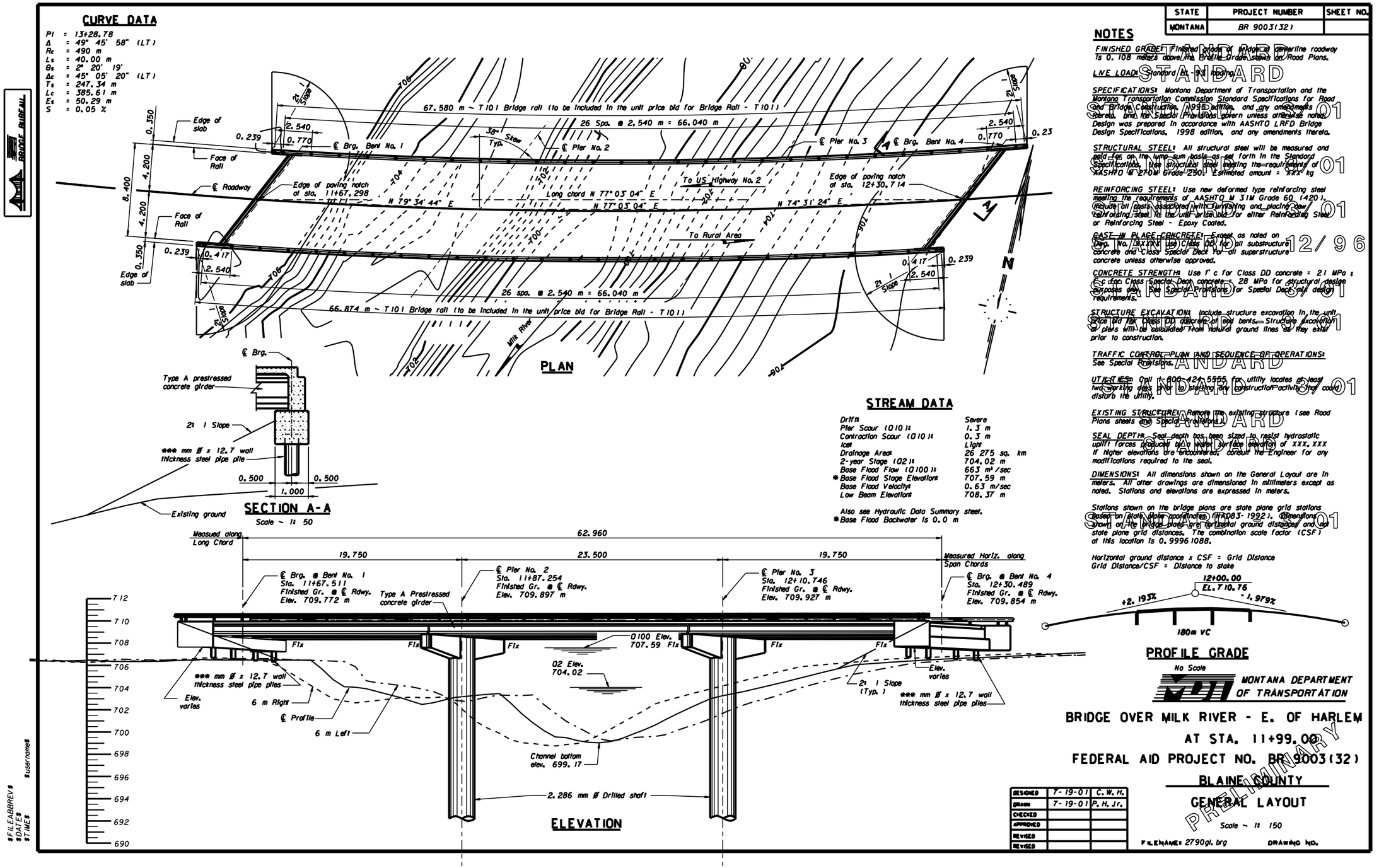


Fig. 7. 3

PLAN/PROFILE SHEET 3

Figure 28-16



MISCELLANEOUS SHEET

Figure 28-17